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ABSTRACT

This study investigates levels and trends in modern contraceptive use among married women in Malawi and explores differences by socio-demographic characteristics. The study uses panel data from the 2000, 2004, and 2010 Malawi Demographic Health Surveys (MDHS), employing multinomial logistic regression. Background variables include the characteristics of women, such as education, urban-rural residence, age, marital status, household wealth, and access to media. In addition, the study explores differences by fertility indicators, including number of children born, desire for more children, and ideal family size.

Modern contraceptive use among married women in Malawi changed little between 2000 and 2004 but increased considerably between 2004 and 2010, from 26% to 42%. Modern contraceptive use remains higher among married women with more education, women in wealthier households, and women with more access to media, although women in most categories have shown increases in contraceptive use. For example, modern contraceptive use among women in rural areas increased from 27% in 2004 to 39% in 2009, compared with an increase among urban women from 35% to 46% over the same period.

The study found that number of living children was significantly associated with modern contraceptive use in all three surveys. Also, women who reported that they wanted to have another child and those who were uncertain about childbearing were significantly more likely to use modern contraception in 2004 and 2010 compared with 2000. Among women who wanted no more children, contraceptive use increased significantly in 2010 compared with 2000.

Increased contraceptive use among women who want no more children and women with high parity indicate that a growing percentage of women want to limit and space childbearing. Thus making effective and long-acting contraceptive methods more available would help many women attain their desired fertility goals. At the same time, the strong association between women's education and modern contraceptive use identified in the study suggests that considerable progress has been achieved in women's education in Malawi, which may have contributed to increases in contraceptive use.

INTRODUCTION

Malawi's current total fertility rate (TFR) has declined over the past 33 years, from a TFR of 7.6 children per woman in 1977 to the current level of 5.7 children per woman (NSO and ICF Macro 2011), but it is still among the highest in the world. Malawi's population of 14 million is growing rapidly, at 2.8% per annum. The country's population is youthful and rural; 45% of the population is under age 15, and 85% of the population lives in rural areas (NSO 2008). The youthfulness of Malawi's population carries a demographic momentum toward further population growth. While Malawi's high fertility reflects socioeconomic and cultural conditions, it also suggests that family planning programs have had little impact on fertility.

Given Malawi's high fertility and rapid population growth, the purpose of the study is to investigate levels and trends and the factors that influence modern contraceptive use in Malawi. The study uses data from the 2000, 2004, and 2010 Malawi Demographic Health Surveys (MDHS), employing multinomial logistic regression (NSO and ORC Macro 2001, NSO and ORC Macro 2005, NSO and ICF Macro 2011). Knowing patterns of contraceptive use can increase understanding of fertility trends, reproductive intentions, and unmet need for family planning, which can help inform policy.

Background to Family Planning in Malawi

While there are many reasons for Malawi's slow decline of fertility and low adoption of modern contraception, one needs to understand the history of family planning in Malawi. Until the 1980s, family planning in Malawi was banned under the one-party system regime. Kenya, a country that started implementing family planning programs in the 1970s almost at the same time as Malawi, currently has a TFR of 4.7, lower than in Malawi by an average one child per woman. The difference reflects Kenya's concerns with the adverse effects that rapid population growth would have on its development, while in Malawi the idea of limiting births was slow to catch on, in a traditionally conservative society that saw promotion of family planning as foreign influence and opted to defend cultural values of large families (Chibwete et al. 2005; Solo et al. 2005). Family planning was forbidden and "child-spacing" was preferred as an integral part of the maternal and child health program in the 1980s, which acknowledged the health problems a

woman faced when pregnancies were too early, too many, too late, and too frequent (Solo et al. 2005).

The advent of a multiparty system in Malawi in 1994 ushered in a new environment in which family planning programs could be implemented. While levels of use of modern contraceptive methods (oral pills, condoms, intrauterine devices (IUDs), sterilization, implants, and injectables) have traditionally been low in sub-Saharan Africa, modern contraceptive use has increased during the past decade (Stephenson et al. 2007; NSO and ORC Macro 2005). Currently in Malawi, an estimated 42% of married women are using modern contraception (NSO and ICF Macro 2011).

Despite the increase in modern contraceptive use, the TFR has remained high, and a slight decline has occurred only recently. While access to family planning is critical to the attainment of the Millennium Development Goals (MDGs), especially MDG 5, and also important to the reduction of poverty, several barriers hinder contraceptive access in Malawi. Most people live in rural areas, and these are the least served by health centers. Gender inequity remains pervasive, especially in the rural areas, where traditional values are strong and gender inequality practices such as support for early marriage of girls, polygany, and widow inheritance make women less autonomous (Matinga and McConville 2002). Such an environment impedes women's greater say in decision-making in general, and particularly concerning their own reproductive health.

Literature Review

Knowledge of the relationship between age and contraceptive use is important in identifying high-risk groups, especially women under age 18 and over age 34, who have increased risk of maternal complications (WHO 2004; UNFPA 2005). The evidence is mixed on the relationship between women's age and use of modern contraceptives. Stephenson et al. (2007) found that in Kenya, Malawi, and Tanzania, with increasing age women were less likely to use modern contraception, while a study on factors affecting contraceptive use in Pakistan found a nonlinear relationship between women's rise in age and contraceptive use (Mahmood and Ringheim 1996). In contrast, another study found increased levels of contraceptive use with

increasing age, which suggested that contraception was used to limit childbearing among women who had attained their desired family size (Njogu 1991).

Little is known regarding contraceptive use among teenage mothers in Malawi. A study in Mangochi, one of the districts in Malawi with highest unmet need for family planning reported in the 2010 MDHS, focused on adolescents and contraceptive use and found that youth are unlikely to access contraceptives due to the societal norms surrounding youth, citing the belief that youth are not supposed to have premarital sex. At the same time, teenage pregnancies contribute to high fertility in Malawi, suggesting that there is low contraceptive use among young women (NSO and ICF Macro 2011). Studies that looked at fertility behavior in Malawi are scarce, particularly studies of changes in contraceptive use over time across population subgroups,. Most of the studies are context-specific and local.

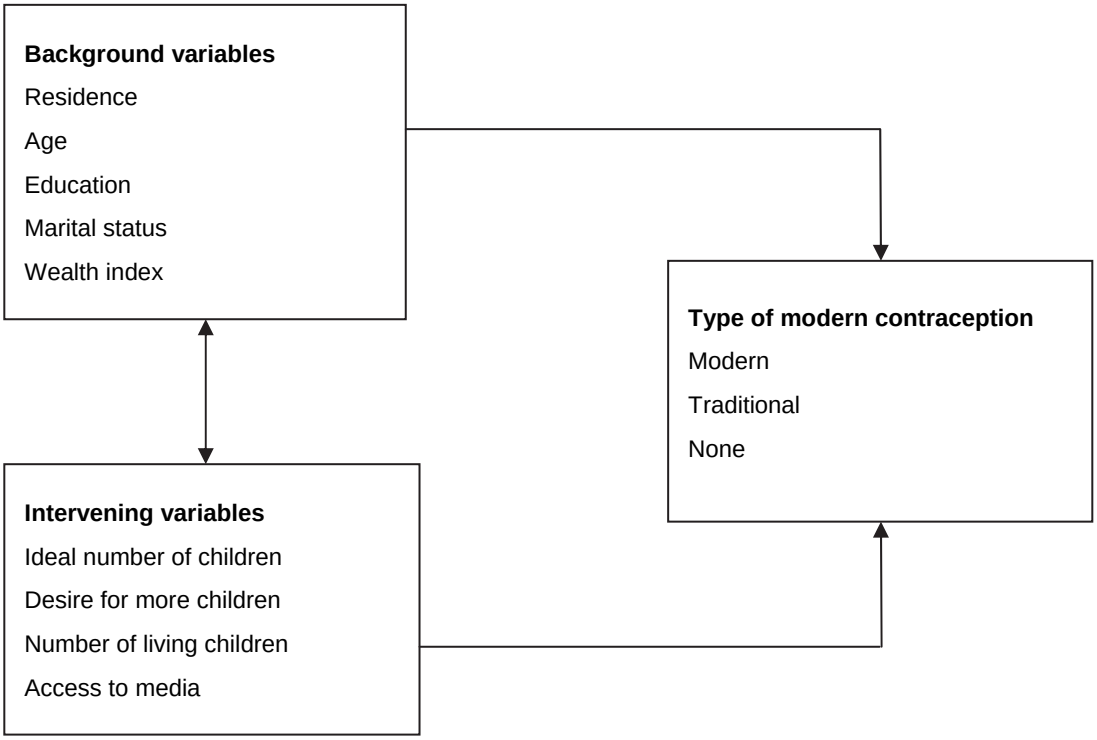
Empirical evidence suggests that the number of children desired by women is declining in most parts of Asia and Latin America, and some parts of western and middle Africa (Westoff and Bankole 2002). While studies show that there has been an increase in the percentage of women who want no more children at high parities in some countries in sub-Saharan Africa, surveys conducted so far in Malawi show that women, even at high parity, want to have more children (NSO and ORC Macro 2005; NSO and ICF Macro 2011). Chimbiri (2007) found that use of contraceptives within marriage is limited. Also, many married couples find it difficult to accept condom use within marriage, considering it to be mainly applicable outside the marriage but not to prevent unwanted pregnancies within marriage.

Place of residence, whether rural or urban, is an important background factor in determining contraceptive use. As Bongaarts has noted, previous studies that have examined rural-urban differentials in contraceptive use consistently show that women who live in urban areas are more likely to use modern contraceptives than their rural counterparts (Bongaarts and Johansson 2000). Urban women, on average, are better educated than rural women, have better access to health and reproductive health services, and are engaged in economic opportunities that often compete with childbearing. Because the majority of the population in Malawi resides in rural areas, which are disadvantaged in terms of the amenities and opportunities found in urban areas and where cultural views are more traditional, it is expected that rural areas should have lower modern contraceptive use than urban areas.

Conceptual Framework

Understanding trends and patterns of the characteristics of contraceptive users is crucial in areas that require scaling up family planning programs. Figure 1 presents a conceptual framework to serve as a tool for understanding the relationship among the variables that influence modern contraceptive use. The outcome variable is modern contraceptive use.

Figure 1. Conceptual framework on determinants of contraceptive use



The background variables include the characteristics of women, such as education, residence, age, marital status, wealth index, and religion. Maternal education, particularly higher levels of education, may increase a woman's knowledge of contraceptive use and hence have a positive impact (McNay et al. 2003). Among intervening variables, future fertility preferences and desired family size have been found to be strong predictors of modern contraceptive use (Westoff and Bankole 1995). Further, women's exposure to the media and messages about

family planning on television and radio and in newspapers have been shown to be associated with higher levels of contraceptive use (Bankole et al. 1996; Gupta et al. 2003).

Significance

Many low-income countries adopted national family planning programs in the 1970s and 1980s, leading to moderate or rapid fertility decline in some countries. In contrast, in Malawi fertility has remained high, partly because there was little investment in a family planning effort. In addition, competing demands from HIV/AIDS placed extraordinary demands on the public health budgets of Malawi. Consequently, this led to stalled or even reduced levels of contraceptive use, with associated slowdowns in fertility transition. Thus the immediate purpose of this study is to contribute to the research on the issues concerning family planning in Malawi and how to resolve these issues to better meet the need for contraception and to reduce Malawi's high fertility rate. Evidence generated by this study will reinforce the case for investment in family planning programs and guide action on how best to increase use of modern contraception.

Objectives

The study's overall objective is to examine modern contraceptive use among married women in Malawi. Specifically, the study aims to:

- Examine differentials in modern contraceptive use with the view of finding out the changes in the proportion of women using modern, traditional, or no methods of contraception.
- Identify changes in methods of contraceptive use over time.
- Examine the characteristics of women using modern contraceptive methods.
- Examine determinants of modern contraceptive use.

DATA AND METHODS

The study uses data from three Malawi Demographic and Health Surveys (MDHS), conducted in 2000, 2004, and 2010. DHS surveys are the most common source of data used to study fertility differentials in developing countries. The advantages of using MDHS data are: first, that the DHS is the only nationally representative survey used by policymakers to evaluate the demographic and health status of the country's population; second, that because surveys are conducted every five years, they allow levels and trends in variables of interest to be measured (Rutstein and Rojas 2006); and third, that the MDHS offers an excellent case study of the TFR because Malawi is one of the countries where the TFR has remained high, while fertility has fallen elsewhere. Since there are comparable questions asked in the MDHS for 2000, 2004, and 2010, it will be possible to measure trends and patterns and the factors affecting fertility behavior during this period.

The datasets were appended and a standardized weight was introduced to account for differentials in sampling probabilities for the different survey years. All analyses were conducted using STATA version 11.

Dependent Variables

The outcome variable is current contraceptive use, coded into three levels: 1=none, 2=traditional, and 3=modern. Modern methods refer to clinic and supply methods such as voluntary surgical sterilization, IUDs, pills, injectables, condoms, and vaginal barrier methods (Bongaarts and Johasson 2000). Traditional methods include periodic abstinence and withdrawal, while folkloric methods, which are less effective, are also coded as traditional. The question "Are you currently using / doing something or using any method to delay or avoid getting pregnant?" was asked of non-pregnant women; women who reported that they were pregnant and women who said that they never had sexual intercourse were excluded from the analysis.

Explanatory Variables

The demographic variables include women's age, coded as 15-24, 25-34, 34-39, 40-44, 45+; and place of residence, coded as 1, urban, and 2, rural. The number of living children is coded as 0, 1-2, 3-4, 5+, while ideal number of children is coded as 0-2, 3-4, 5+ and unknown, representing non-numerical values or 'up to God' responses. Women's fertility preferences, as to when they whether and how soon they want another child, are coded as have another, undecided, and want no more. In this study, women who reported being sterilized and infecund are treated as "want no more."

In addition to these variables, socioeconomic variables include education, defined as highest level of education a woman attained, and coded as: no education, primary, and secondary and higher. The DHS wealth index is an appropriate variable to represent woman's economic status. It is coded in quintiles: poorest, poor, middle, rich, and richest. Access to media includes frequency of access to newspapers/magazines, radio, and television, each with several possible responses: not at all, only once a week, almost every week, and almost daily.

Descriptive Analysis

To show the proportions of women who reported using a particular modern contraceptive method for each survey year, a descriptive analysis was undertaken against selected explanatory variables, using chi-square as a test of significance.

Multinomial Logistic Regression

As contraceptive practice can vary tremendously by age, educational attainment, and urban or rural residence as well as other socioeconomic factors, multinomial logistic regression analysis was undertaken to study the relationship of the explanatory variables. Multinomial logistic regression (mlogit) was used as an extension of the binary logistic regression because it allows the simultaneous comparison of more than one contrast (i.e. dependent variable with more than two categories). The dependent variable was coded into three main categories: modern, traditional, and none. By default, mlogit sets the reference category to the outcome with the most

observations (non-users of modern contraception). Mlogit reports Relative Risk Ratios (RRR) for the effect of each explanatory variable on each category relative to the base category. Hence, one can easily see whether, say, rural residence significantly affects the likelihood of women using modern contraception versus the no-use category. Since the focus of the paper is on modern contraception, the results only show the relative risk ratios for modern contraception use versus non-use.

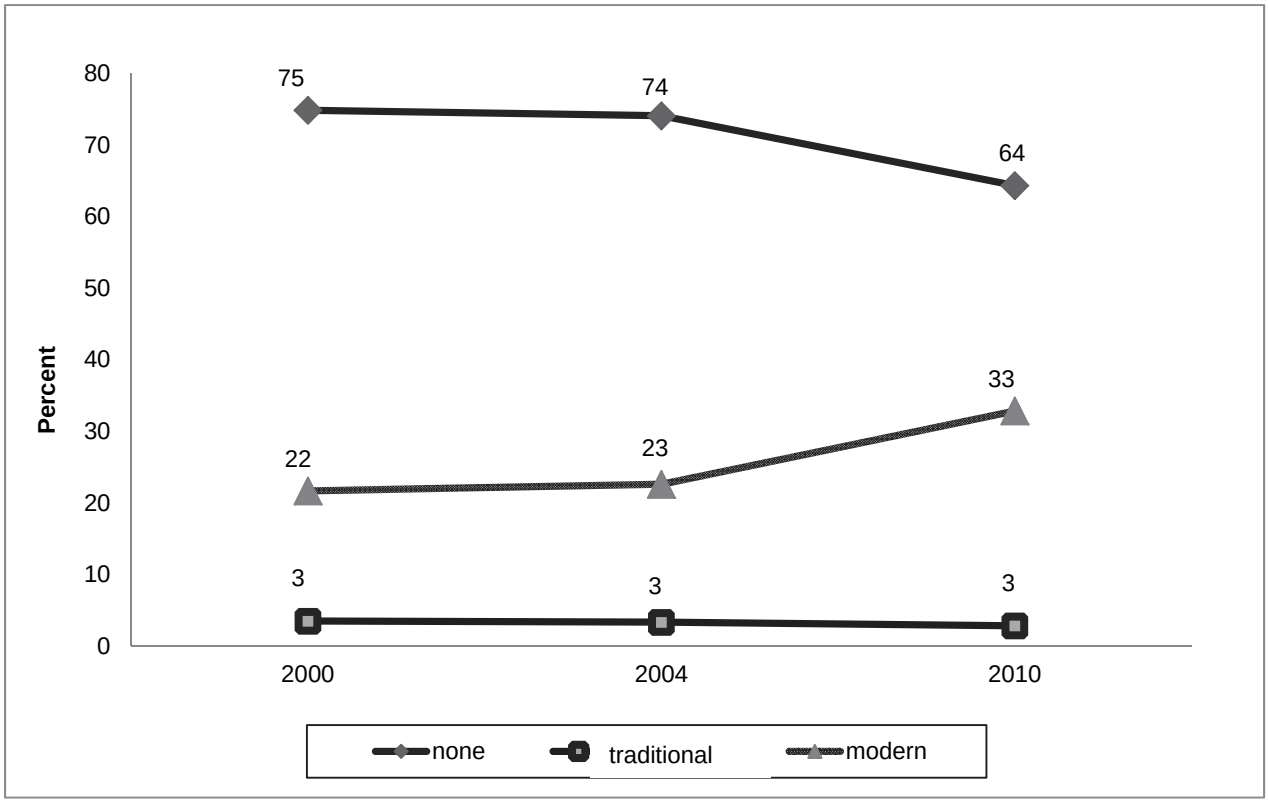
To examine change by survey year for each modern contraceptive method, the variable current contraceptive method was coded into seven categories: injectables, pill, IUD, female sterilization, male sterilization, male condoms, and female condoms. Since the dependent variable is polytomous, multinomial logistic regression was used to assess specific methods to ascertain whether the change by survey year was significant, with 2000 as the reference year.

RESULTS

Trends and Levels in Modern Contraceptive Use

This section presents results of differentials in current contraceptive use by comparing trends and levels in contraceptive use for 2000, 2004, and 2010. Figure 2 shows levels and trends in contraceptive use in Malawi among all married women in the last decade.

Figure 2. Trends and levels according to type of contraception by all women in Malawi, 2000, 2004, and 2010 MDHS



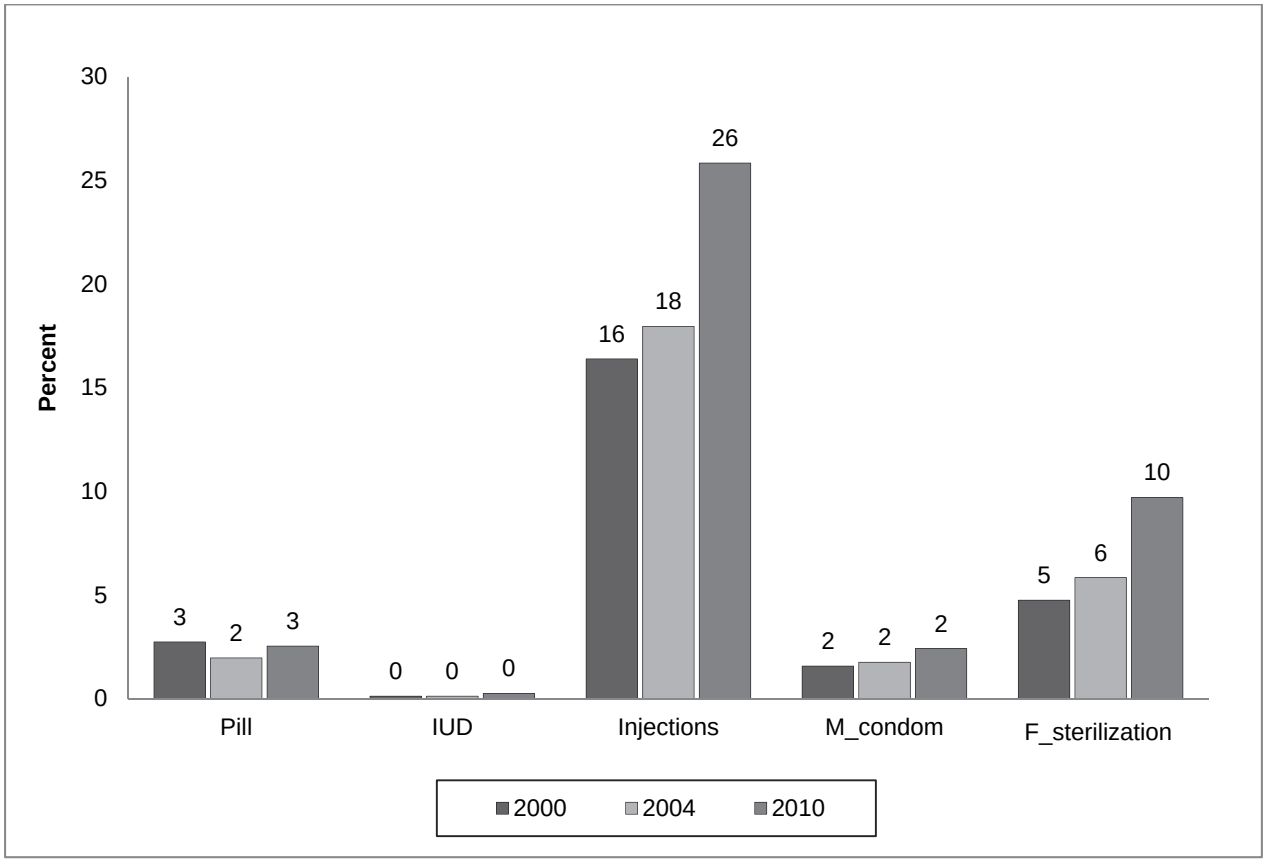
Use of modern contraception among all women generally did not differ substantially between 2000 and 2004, at 22 percent and 23 percent, respectively. The level increased to 33 percent in 2010. Although the proportion of all women who reported not using any method of contraception declined in 2010, it remains high, at 64 percent. The results also show that the

proportion of all women who use traditional methods of contraception has remained the same, at only 3 percent.

Trends and Levels by Specific Method

Figure 3 shows the levels and trends in use of each type of modern contraception (the percentage of married women using an each method) in the 2000, 2004, and 2010 survey rounds.

Figure 3. Method mix in Malawi among currently married women, 2000, 2004, and 2010 MDHS



In 2010, injections were the most commonly used contraceptive method among currently married women (26%), up from 18% in 2004 and 16% in 2000. In 2010, 10% of women relied on female sterilization, twice the level in 2000, Use of the pill and male condoms has remained

constant at low levels over the survey period, at 2% to 3%. An extremely small percentage of women use the IUD.

Change by Each Contraceptive Method by Survey Year

To establish whether the changes shown in Figure 3 were due to survey effects, a multinomial logistic regression was run for each type of contraception method. Table 1 summarizes the changes in method mix by survey year, with survey year 2000 as the reference category.

Table 1. Relative Risk Ratios (RRR) of change in method mix among currently married women, 2000, 2004, 2010 MDHS

Method of contraception	Survey year [b]	RRR[c]	[95% Conf. Interval]	
Pill [a]	2004	0.59***	0.48	0.72
	2010	0.51***	0.44	0.60
IUD	2004	0.74	0.34	1.62
	2010	0.79	0.42	1.45
Condom	2004	0.75**	0.61	0.89
	2010	0.84+	0.72	0.98
Female sterilization	2004	1.04	0.91	1.20
	2010	1.23***	1.10	1.38
Male sterilization	2004	0.41	0.08	2.09
	2010	0.66	0.22	1.98

Notes: a. Injections is the base outcome,
b. 2000 is the reference category,
c. *+p<0.05, *p <0.01, **p<0.005, ***p<0.001*

Use of the pill with respect to injectables (the base outcome) declined by almost 41% in 2004, while in 2010 it was down by 49%. This is also true for male condom use in 2004 (25%) and 2010 (16%). However, use female sterilization significantly increased in 2010, by 23%.

Descriptive Results of Trends and Levels in Contraceptive Use

Table 2 shows the proportions of the sample of currently married women according to selected socioeconomic and demographic variables. In 2000, 38% of currently married women in urban areas were using modern contraception. The proportion, however, declined to 35% in 2004 before rising sharply to 50% in 2010. Although there was a gradual increase in modern contraceptive use among women in rural areas, the percentage was consistently lower than in urban areas at all three survey periods, with the highest proportion in 2010, at 41%.

Table 2. Percent distribution (and confidence intervals) according to current use of modern contraception among currently married women age 15-49 by selected background characteristics, 2000, 2004, 2010 MDHS

Background characteristics		2000 MDHS		2004 MDHS		2010 MDHS	
Residence***	Urban	38.2	[34.1,42.5]	34.7	[31.8,37.8]	49.6	[46.1,53.1]
	Rural	24.1	[22.7,25.6]	26.9	[25.5,28.4]	40.7	[39.2,42.2]
Education***	No education	21.7	[19.9,23.7]	22.9	[20.8,25.3]	37.1	[34.6,39.7]
	Primary	26.5	[24.8,28.2]	28.0	[26.5,29.5]	42.1	[40.5,43.8]
	Secondary+	41.6	[35.5,48.0]	41.0	[37.0,45.2]	48.5	[45.8,51.2]
Age***	15-19	12.9	[10.5,15.8]	16.6	[13.8,19.8]	26.4	[23.0,30.0]
	20-24	22.7	[20.6,24.9]	25.4	[23.2,27.8]	38.0	[35.7,40.4]
	25-29	29.9	[26.1,34.1]	30.8	[28.1,33.6]	45.0	[42.6,47.5]
	30-34	30.2	[27.2,33.4]	31.6	[28.5,34.8]	46.0	[437,48.4]
	35-39	31.5	[28.5,34.8]	31.8	[28.3,35.5]	49.1	[46.1,52.0]
	40-44	31.6	[28.0,35.5]	33.3	[29.5,37.4]	45.0	[41.5,48.5]
	45-49	20.4	[17.2,24.2]	26.7	[22.7,31.1]	38.2	[34.5,42.0]
Reading magazine***	Not at all	23.8	[22.4,25.4]	26.1	[24.7,27.7]	40.5	[38.9,42.1]
	Less than once a week	29.9	[27.0,32.9]	33.9	[30.8,37.1]	47.0	[44.5,49.6]
	At least once a week	38.2	[31.3,45.6]	34.6	[30.4,39.1]	44.5	[40.5,48.5]
	Almost every day	43.5	[35.6,51.8]	36.1	[29.0,43.8]	51.3	[44.7,57.9]
Radio***	Not at all	19.4	[17.1,21.9]	24.6	[22.0,27.5]	37.7	[35.4,40.1]
	Less than once a week	22.8	[20.7,25.1]	26.6	[23.48,30]	40.1	[37.5,42.7]
	At least once a week	28.7	[25.0,32.6]	25.1	[22.1,28.4]	39.5	[36.7,42.3]
	Almost every day	30.7	[28.5,33.0]	30.4	[28.7,32.1]	46.4	[44.5,48.3]
Television***	Not at all	25.3	[23.7,26.9]	26.8	[25.5,28.2]	40.9	[39.4,42.5]
	Less than once a week	28.8	[24.4,33.6]	32.5	[26.7,38.8]	42.7	[39.8,45.6]
	At least once a week	42.9	[32.9,53.5]	32.7	[24.5,42.0]	45.1	[40.1,50.1]
	Almost every day	52.6	[45.5,59.6]	48.4	[41.5,55.4]	51.3	[47.2,55.3]

Cont'd..

Table 2. Cont'd

Wealth index***	Poorest	19.8	[17.4,22.5]	21.8	[19.2,24.6]	34.9	[32.5,37.4]
	Poor	24.2	[21.4,27.4]	24.2	[21.8,26.7]	39.8	[37.4,42.3]
	Middle	24.9	[22.8,27.3]	25.2	[22.8,27.7]	41.4	[39.0,43.8]
	Rich	25.3	[22.8,28.1]	31.1	[28.5,33.7]	45.3	[42.8,47.8]
	Richest	36.2	[33.1,39.4]	37.6	[34.9,40.4]	48.4	[45.7,51.1]
No. of living children**	0	2.6	[1.6,4.1]	1.8	[1.0,3.1]	4.9	[3.4,7.0]
	1-2	22.1	[20.3,24.0]	26.2	[24.2,28.2]	37.9	[35.9,39.9]
	3-4	31.6	[29.0,34.4]	33.0	[30.6,35.5]	48.0	[45.9,50.1]
	5+	37.8	[35.3,40.4]	36.5	[33.9,39.2]	50.7	[48.4,53.0]
Fertility preference***	Have another	19.5	[18.1,21.1]	23.3	[21.7,25.0]	35.9	[34.1,37.8]
	Undecided	9.8	[5.4,17.1]	16.2	[11.9,21.6]	29.9	[23.8,36.9]
	No more	34.5	[32.4,36.6]	35.5	[33.4,37.6]	49.4	[47.6,51.1]
Ideal no. of children***	0-2	25.1	[22.0,28.4]	32.7	[29.0,46.5]	41.4	[38.2,44.7]
	3-4	27.2	[25.4,29.2]	28.3	[26.7,30.0]	43.9	[42.3,45.6]
	5+	25.4	[23.5,27.3]	27.0	[25.0,29.2]	40.0	[37.8,42.2]
	Unknown	21.8	[16.7,27.9]	20.2	[15.4,26.1]	42.5	[33.0,52.5]
Total		26.1	[24.7,27.6]	28.2	[26.8,29.5]	42.4	[41.0,43.8]
Population size		**9,541**		**8,312**		**15,527**	

*+P<0.05, *p <0.01, **p<0.005, ***p<0.001*

Table 2 also describes the proportion of currently married women by their level of highest education attained, with regard to modern contraception use. Overall, with increasing educational attainment the proportion of women reporting using modern contraception also increases. In the 2000 MDHS, for example, 22% of women with no formal education, 27% with primary education, and 42% with secondary education and higher were using modern contraception. The gaps in contraceptive use by educational attainment persist but have decreased in magnitude over the survey period.

Among age groups, currently married women age 15-19 reported least use of modern contraception across the three survey years. This may not be surprising because they are at the beginning of their reproductive years and many may not yet need contraception. Nonetheless, the proportion of women age 15-19 using modern contraception doubled between 2000 and 2010, from 13% to 26%.

Contraceptive use patterns by age differ across the survey years. In 2000, modern contraceptive use increased by women's age, reaching a peak among women age 35-44, at 32%,

and declining to about 20% at age 45-49. A similar pattern can be observed in 2004, when the increase in use begins among women age 25-29 and reaches a peak among women age 40-44, at 33%. In 2010, however, there is a sharp rise in modern contraceptive use among all age groups, peaking at 49 among women age 35-39.

Table 2 also presents modern contraceptive use by married women's level of access to television, radio, and newspapers/magazines. In all three surveys the percentages of women using modern contraception were lowest for those who had no access to the three forms of media. In 2010, the highest percentages of modern contraceptive use were among women who reported daily access to television and daily reading magazines, at 51% each, and somewhat lower for daily listening to radio, at 46%. Among women reporting no access to radio, modern contraceptive use was 38%,

Modern contraceptive use increases from the poorest to the richest quintiles. Across the survey years, however, all wealth categories increased in levels of modern contraceptive use. Contraceptive use among married women in the poorest quintile increased from 20% in 2000 to 35% in 2010. Among women in the richest quintile, modern contraceptive use increased from 36% in 2000 to 48% in 2010.

The percentage of women using modern contraception increases with the number of living children, suggesting that women begin to space or limit the number of children once they reach their desired family size. There are few differences between 2000 and 2004, but the proportions increase substantially in 2010. Regarding ideal family size, women who did not mention a figure or said it was 'up to God' had lower levels of modern contraceptive use in 2000 and 2004, but in 2010 had levels of contraceptive use comparable to other women.

Change in Each Predictor Variable Category by Survey Year

Table 3 shows the results of multinomial regression analysis. Compared with the reference category of 2000, modern contraceptive use among married women in urban areas was significantly higher in 2010, while in the rural areas changes were significant in both 2004 and 2010. For education, significant change in modern contraceptive use occurred in 2010, with respect to women who had attained no education and those with a primary education. For age,

significant change was observed among women age 45-49 in 2004, while in 2010 all age categories showed significant change, with the greatest change among women age 45-49.

In 2004, only women who did not listen to the radio experienced a significant increase in modern contraception use compared with 2000. In 2010, save for women who did not read at all and women read a magazine almost daily, there were no significant changes in modern contraceptive use. However, while there was significant change across all the categories among women who listed to the radio in 2010, the greatest increase occurred among women who did not listen to the radio at all.

By household wealth quintiles, in 2004 significant increases in modern contraceptive use were limited to women in the fourth (rich) quintile; however in 2010 significant change occurred among all wealth quintiles categories, with the greatest increase among women in the rich quintile. Compared with the reference year of 2000, modern contraceptive use in 2004 declined significantly among women who had no children (parity 0). However, it increased among women with 1-2 children. In 2010, there was a significant increase in use of modern contraception among women with at least one child, at all parties.

Table 3. Relative Risk Ratios (RRR) of change in category of the explanatory variables in modern contraceptive use among currently married women, 2000, 2004, 2010 MDHS

Background variables		2004 MDHS	2010 MDHS
Residence	Urban	0.83	1.38***
	Rural	1.10^{+}	1.85***
Highest education	No education	1.07	2.00***
	Primary	1.08	1.82***
	Secondary+	0.85	1.19
Age	15-19	1.11	1.33^{+}
	20-24	1.06	1.82***
	25-29	0.96	1.79***
	30-34	1.00	1.88***
	35-39	0.95	1.91***
	40-44	1.07	1.66***
	45-49	1.44**	2.37***
Reading magazine	Not at all	1.07	1.89***
	Less than once a week	1.12	1.78
	At least once a week	0.85	1.03
	Almost every day	0.89	1.36^{+}

Cont'd..

Table 3. Cont'd

Background variables		2004 MDHS	2010 MDHS
Listening to radio	Not at all	1.23+	2.23***
	Less than once a week	1.13	1.80***
	At least once a week	0.86	1.45***
	Almost every day	0.95	1.67***
Watching television	Not at all	1.06	1.82***
	Less than once a week	0.95	1.64***
	At least once a week	0.84	1.16
	Almost every day	0.81	1.15
Wealth index	Poorest	1.06	1.85***
	Poor	1.01	1.90***
	Middle	1.02	1.88***
	Rich	1.31***	2.13***
	Richest	0.89	1.29***
No. of living children	0	0.61**	1.01
	1-2	1.18+	2.05***
	3-4	1.00	1.81***
	5+	0.94	1.64***
Fertility preference	Have another	1.45***	1.78***
	Undecided	2.48**	3.15***
	No more	1.04	1.78***
Ideal no. of children	0-2	1.27+	1.62***
	3-4	1.00	1.77***
	5+	1.09	1.84***
	Unknown	0.82	1.96**

+*p<0.05,* ***p <0.01,* ****p<0.005,* *****p<0.001*
2000 the reference year

Women who reported that they wanted to have another child and those who were uncertain about childbearing were significantly more likely to use modern contraception in 2004 and 2010 compared with 2000. Among women who wanted no more children, contraceptive use increased significantly in 2010 but not in 2004. Concerning women's ideal family size, there was a significant increase in modern contraceptive use among married women who reported 0-2 as ideal number of children in 2004, but in 2010 there were significant increases among all categories of ideal family size, compared with 2000.

Multinomial Logistic Regression Analysis

To assess the predictors of modern contraceptive use in each survey round, multinomial logistic regression was run controlling for selected explanatory variables. Table 4 shows that in 2000, 2004, and 2010, married women in the rural areas were significantly less likely than urban residents to use modern contraception (versus no contraceptive use).

There are variations by survey year in the age groups in which the association becomes significant. In 2000, compared with women age 15-19, women age 30-34 were significantly less likely to use modern contraception. In 2004, however, the pattern starts at age 25-29, and in 2010 it starts at age 20-24. This shows that over time women in Malawi have started using modern contraception (versus using no method) at younger ages. Furthermore, for each survey year the magnitude of relative risk ratios (RRR) declines with increasing age, suggesting that women in older age groups are less likely to use contraception.

Among variables concerning access to media, Table 4 shows that in 2000 and to an even greater degree in 2004 women who had substantial access (almost every day) to television had greater odds of using modern contraception compared with the reference group of women who had no access to television. Listening to radio had much less association with modern contraceptive use, however. Only in 2010 were women who listened to radio significantly more likely to use modern contraception compared with women who did not have any access to radio.

Women's position on the wealth index, as a proxy measure of women's economic status, shows an influence on modern contraceptive use. With the poorest quintile as a reference category, women in the richest quintile were significantly more likely to use modern contraception, across all survey years. Women in the rich quintile also were more likely to use modern contraception in all three surveys. In 2010, women in all other wealth quintiles were more likely to use modern contraception compared with women in the poorest quintile.

Among the control variables, the number of living children was significantly associated with modern contraceptive use in all the survey rounds, and the relative risk ratios were greatest in magnitude. Further, there were differentials in magnitude of relative risk ratios across the survey years, with the greatest in 2004. Although there was a dip in magnitude when relative risk

ratios in 2010 were compared wtih 2004, overall they were higher than those observed in 2000, with the exception of women who had five or more children in 2010. This may suggest that the number of living children is a strong predictor of modern contraceptive use among married women.

Table 4. Relative Risk Ratios (RRR) (and standard errors) from multinomial logistic regression analyses assessing associations between selected characteristics and use of modern contraception among currently married women, full model, 2000, 2004, 2010 MDHS

		Modern vs. none (2000)	Modern vs. none (2004)	Modern vs. none (2010)
Place of residence	Rural	0.76 (0.08)*	1.04 (0.10)	0.78 (0.07)*
	Urban (Ref.)			
Level of education	Primary	1.29 (0.11)**	1.38 (0.11)***	1.27 (0.09)***
	Secondary	2.16 (0.35)***	2.40 (0.32)***	1.69 (0.18)***
	No education (Ref.)			
Age	20-24	1.11 (0.18)	0.85 (0.12)	0.80 (0.08) +
	25-29	1.03 (0.16)	0.75 (0.11) +	0.68 (0.08)***
	30-34	0.71 (0.13) +	0.64 (0.11)**	0.56 (0.07)***
	35-39	0.63 (0.13) +	0.51 (0.09)***	0.58 (0.08)***
	40-44	0.58 (0.12)**	0.58 (0.10) ***	0.50 (0.07)***
	45-49	0.32 (0.07)***	0.42 (0.08) ***	0.36 (0.06)***
	15-19 (Ref.)			
Reading magazine	Less than once a week	1.02 (0.10)	1.11 (0.10)	1.15 (0.08) +
	At least once a week	1.30 (0.22)	1.08 (0.13)	1.16 (0.11)
	Almost every day	1.26 (0.25)	0.85 (0.16)	1.36 (0.22)
	Not at all (Ref.)			
Listening to radio	Less than once a week	1.19 (0.13)	1.02 (0.12)	1.08 (0.09)
	At least once a week	1.62 (0.41)	0.94 (0.11)	1.07 (0.09)
	Almost every day	1.53 (0.40)	1.07 (0.10)	1.32 (0.09)***
	Not at all (Ref.)			
Watching television	Less than once a week	0.90 (0.12)	0.99 (0.15)	0.96 (0.07)
	At least once a week	0.40 (0.18)***	1.00 (0.24)	1.09 (0.13)
	Almost every day	1.55 (0.14)***	1.88 (0.30)***	1.06 (0.12)
	Not at all (Ref.)			
Wealth index	Poor	1.09 (0.11)	1.10 (0.12)	1.24 (0.09)**
	Middle	1.03 (0.11)	1.15 (0.12)	1.20 (0.09)*
	Rich	1.22 (0.14)	1.46 (0.16)***	1.29 (0.10)***
	Richest	1.41 (0.15)**	1.43 (0.18)*	1.27 (0.12)*
	Poorest (Ref.)			

Cont'd..

Table 4. Cont'd

		Modern vs. none (2000)	Modern vs. none (2004)	Modern vs. none (2010)
Number of living children	1-2	11.93 (3.23)***	23.86 (7.06)***	13.65 (2.72)***
	3-4	25.68 (7.84)***	47.77 (14.3)***	28.94 (6.10)***
	5+	51.65 (17.6)***	79.27 (24.8)***	47.60 (10.4)***
	0 (Ref.)			
Want another child	Undecided	0.36 (0.13)**	0.53 (0.10)***	0.64 (0.11)*
	No more	1.47 (0.10)***	1.22 (0.10)***	1.23 (0.08)***
	Have another (Ref.)			
Ideal size	3-4	0.98 (0.10)	0.71 (0.08)***	0.98 (0.08)
	5+	0.77 (0.09) $^{+}$	0.57 (0.07)***	0.70 (0.07)***
	Unknown	0.69 (0.14)	0.42 (0.08)***	0.66 (0.15)
	0-2 (Ref.)			
Population size		**9,410**	**8,276**	**15,242**
Design df (F)		**547 (11.3)**	**520 (48.4)**	**846 (84.2)**

$^{+}$*p<0.05,* ***p <0.01,*** ****p<0.005,*** *****p<0.001***

Compared with women who were certain that they wanted to have another child, women who were uncertain about having another child were less likely to use modern contraception. In all three surveys women who wanted no more children were more likely to use modern contraception than women who wanted another child. In 2004, women who said that their ideal number of children was three and more, as well as women who did not know how many was ideal (or was up to God), were less likely to use modern contraception compared with women who had two children or fewer. Furthermore, women who gave five children and more as their ideal number were less likely to use modern contraception, across the survey years.

DISCUSSION AND CONCLUSION

This study has some limitations. Cross-sectional data sets from independently drawn survey samples can show associations, but it is difficult to establish cause and effect. Also, for studies of trends, longitudinal data that follow the same respondents over time would be better than comparisons of data from successive surveys. The results may also be biased because they are based on self-reporting by respondents and thus may suffer from misreporting. Finally, it is difficult using DHS data to associate the rapid increase in contraceptive use between 2004 and 2010 in Malawi with specific family planning programs carried out by governmental and non-governmental organizations.

Nevertheless, the evidence from this analysis shows substantial progress in modern contraceptive use by women in Malawi since 2004. This change has been driven in part by more women wanting to limit and space their births, particularly among women with high parity. Although more women in rural areas are using modern contraceptive methods than a decade ago, they remain less likely to use modern contraception than their urban counterparts. The trend of increased contraceptive use among women who want no more children and women with high parity indicates that a growing percentage of women want modern contraceptives and that, therefore, making effective and long-acting contraceptive methods more available will help many women attain their desired fertility goals.

At the same time, considerable progress has been achieved in education in Malawi, including free primary education and the girl child policies. Such steps might help to explain the strong association between women's education and modern contraceptive use identified in the study.

The fact that modern contraceptive use in general remains low in Malawi is an indication that limited resources have been allocated to improving access to contraception. This is particularly true for long-acting and permanent family planning methods. As observed in this study, only a small proportion of contraceptive users rely on female sterilization, and the proportions are even smaller for IUDs. There is still a challenge in that many women are relying on short-acting and less reliable methods to prevent pregnancy, while the majority of married women do not use any contraceptive method at all. Further, it is evident that there is a reliance on one method, injectables. The popularity of this method may suggest that, on one hand, there is lot

of emphasis placed on injectables as a family planning method. On the other hand, it may imply that other long-acting methods are in short supply, possibly due to a lack of the expertise needed to administer these methods.

The study has demonstrated that women are more likely to use modern contraception with increasing parity. This should be the starting point to develop a deliberate policy focused on this population that aims at providing wide availability of effective modern contraceptive methods to prevent unwanted pregnancies and avoid unsafe abortions, particularly among women in the rural areas who are disadvantaged in access to health facilities.

REFERENCES

Bankole, A., G. Rodriguez, and C.F. Westoff. 1996. "Mass Media Messages and Reproductive Behavior in Nigeria." *Journal of Bisocial Sciences* 28: 227-39.

Bongaarts, J., and E. Johansson. 2000. *Future Trends in Contraception in the Developing World: Prevalence and Method Mix.* Issue 141 of Working Papers. New York, NY, USA: Policy Research Division, Population Council.

Chimbiri, A. 2007. "The Condom Is an 'Intruder in Marriage': Evidence from Rural Malawi." *Social Science and Medicine* 64(5): 1102-15.

Chimbwete, C., S.C. Watkins, and E.M. Zulu. 2005. "The Evolution of Population Policies in Kenya and Malawi." *Population Research and Policy Review* 24: 85-106.

Gupta, N., C. Katende, and R. Bessinger. 2003. "Associations of Mass Media Exposure with Family Planning Attitudes and Practices in Uganda." *Studies in Family Planning* 34: 19-31.

Khan, S., V. Mishra, F. Arnold, and N. Abderrahim. 2007. *Contraceptive Trends in Developing Countries.* DHS Comparative Reports No. 16. Calverton, MD, USA: Macro International Inc.

Mahmood, N., and K. Ringheim. 1996. "Factors Affecting Contrcaeptive Use in Pakistan." *The Pakistan Development Review* 35(1): 1-22.

Matinga, P., and F. McConville. 2002. *A Review of Sexual Beliefs and Practices Influencing Sexual and Reproductive Health and Health Seeking Behaviour*. Lilongwe, Malawi: DFID.

McNay, K., P. Arokiasamy, and R. Cassen. 2003. "Why Are Uneducated Women in India Using Contraception? A Multilevel Analysis." *Population Studies* 57(1): 21-40.

National Statistical Office (NSO) [Malawi], and ICF Macro. 2011. *Malawi Demographic and Health Survey 2010.* Zomba, Malawi: NSO and ICF Macro.

National Statistical Office (NSO) [Malawi], and ORC Macro. 2005. *Malawi Demographic and Health Survey 2004.* Zomba, Malawi: NSO and ORC Macro.

National Statistical Office (NSO) [Malawi], and ORC Macro. 2001. *Malawi Demographic and Health Survey 2000.* Zomba, Malawi: NSO and ORC Macro.

Rutstein, S., and G. Rojas. 2006. *Guide to DHS Statistics*. Calverton, MD, USA: ORC Macro.

Solo, J., R. Jacobstein, and D. Malema 2005. *Repositioning Family Planning - Malawi Case Study: Choice, Not Chance.* New York, NY, USA: The ACQUIRE Project/EngenderHealth.

Stephenson, R., A. Baschieri, S. Clements, M. Hennink, and N. Madise. 2007. "Contextual Influences on Modern Contraceptive Use in Sub-Saharan Africa." A*merican Journal of Public Health* 97: 1233-1240.

United Nations Population Fund (UNFPA). 2005. "Facts about Safe Motherhood." Accessed on 10/22/2012. http://web.unfpa.org/mothers/facts.htm

Westoff, C.F., and A. Bankole. 2002. Reproductive Preferences in Developing Countries at the Turn of the Century. DHS Comparative Reports. No.2. Calverton, Maryland, USA: ORC Macro.

Westoff, C.F., and A. Bankole. 1995. *Unmet Need 1990–1994.* Demographic and Health Surveys Comparative Studies. No. 16. Calverton, MD, USA: Macro International Inc.

World Health Organization (WHO). 2004. *Improving Maternal, Newborn and Child Health in the Southeast Asia Region: Indonesia.* WHO Regional Office for Southeast Asia (SEARO). Accessed on 10/22/2012. http://searo.who.int/LinkFiles/Improving_maternal_newborn_and_child_health_indonesia.pdf