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**Starting, Stopping and Switching:
Contraceptive Dynamics and Fertility in Rural Northern Malawi**

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Research group affiliations: Population Studies Group

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Abstract

Background

This thesis examines the complex relationship between fertility intentions, contraception, and fertility in northern Malawi. Malawi has one of the highest contraceptive prevalence rates (CPR) in sub-Saharan Africa (42%), puzzlingly coupled with one of the highest fertility rates (5.7)[1]. Conventional assessments of contraception do not furnish a clear understanding of contraceptive dynamics. The Karonga Prevention Study (KPS) provides a unique opportunity to unpack these issues.

Methods

A secondary data analysis was conducted to explore whether rates of conception varied by fertility intentions and contraceptive use in Karonga. A new one-year prospective longitudinal study collected provider-recorded data on contraceptive services, using patient-held records for 4,678 women aged 15-49, allowing an exploration of postpartum uptake, contraceptive switching and discontinuation. In-depth interviews explored women's reasons for contraceptive choices and changes.

Findings

Women who wanted a child within two years had a 45.5% chance of conceiving within two years, as compared to an 11.7% chance for women who wanted no more children. A novel construct of the CPR was used (the "*actual CPR*") and estimated at 35.1%. There was high discontinuation of injectables and oral contraception pills (OCP) (only 51.2% of injection-users and 27.9% of OCP-users had their next injection/pill-cycle on time), and just 15.1% managed to adhere to the injection schedule consistently over 12 months. Amongst postpartum women, 28.4% initiated contraception within six months. Women viewed themselves as contraception users even if they were not using the methods consistently.

Implications

The *actual CPR* was lower than conventional estimates, demonstrating that conventional estimates of contraceptive use must be corrected to account for periods of non-use. The reliance on short-term methods, and high discontinuation rates contribute to persistently high fertility in Malawi. In a context of relatively good provision of contraceptive services, quality of care must be improved, and strategies to motivate women to adhere to their method of choice must be employed. Promotion of long-acting methods is also key.

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Acronyms and Abbreviations

ALPHA	Analysing Longitudinal Population-based HIV/AIDS data on Africa
ANC	Antenatal Clinic
ART	Antiretroviral Therapy
BLM	Banja La Mtsogolo (part of the Marie Stopes partnership)
CBDA	Community Based Distribution Agent
CHAM	Christian Health Association of Malawi
COM	College of Medicine, University of Malawi
COMREC	College of Medicine Research and Ethics Committee
CPR	Contraceptive Prevalence Rate
CYP	Couple Year of Protection
DHS	Demographic and Health Survey
DSS	Demographic Surveillance Site
ESRC	Economic and Social Research Council
FGD	Focus Group Discussion
FP	Family Planning
HSA	Health Surveillance Assistant
HIV	Human Immunodeficiency Virus
IDI	In-depth Interview
IUD	Intra-uterine device
IUSSP	International Union for the Scientific Study of Population
KPS	Karonga Prevention Study
LSHTM	London School of Hygiene and Tropical Medicine
MDICP	Malawi Diffusion and Ideational Change Project
MICS	Multiple Indicator Cluster Surveys
OCP	Oral Contraceptive Pill
PMTCT	Prevention of Mother to Child Transmission
PPA	Postpartum Abstinence
PPR	Parity Progression Ratio
STI	Sexually Transmitted Infection
TFR	Total Fertility Rate
UNC	University of North Carolina
WHO	World Health Organization
95% CI	95% Confidence Interval

Glossary of terms

<i>Actual contraceptive prevalence rate</i>	The proportion of women who are currently using a modern method of contraception, and accounts for discontinuation and gaps in use. It is calculated from provider-recorded data and does not rely on self-reports. This term was coined in this thesis.
Amenorrhea	The absence of menstruation
Calendar data	Contraceptive calendars capture a woman's retrospective self-reported contraceptive status (and method), pregnancies, births, breastfeeding and terminations every calendar month for the five years prior to interview
Contraceptive Dynamics	Refers to contraceptive switching, discontinuation, and method-failure
(modern) Contraceptive prevalence rate	The proportion of (currently married) women who self-report they are currently using a (modern) method of contraception
Consistent use	Adequate continuous contraceptive use with no breaks. Can include method-switching, as long as there is no gap in use.
Couple Year of Protection	Estimated protection from pregnancy provided by contraceptive methods over a one-year period
Ever-use	Measure of the cumulative experience of a population with family planning. No distinction between past and current use. In this thesis, ever-use refers to the period of observation during the family planning card study.
Fertility Intentions	Intendedness of children
Matrilineal	Observes kinship with and descent through females
Method-related discontinuation	Dissatisfaction or problems with the method (e.g. side-effects), leading to discontinuation
Modern-method of contraception	Includes: Female sterilization (tubal ligation), male sterilization, the IUD, implant, injectables, oral contraceptive pill, male and female condoms.
Parity	Number of children ever born to a woman: Accumulation of births over a woman's entire reproductive period.
Parity Progression Ratio	The proportion of women who progress from one parity to the next

Patrilineal	Observes kinship with and descent through males
Patrilocal	Marriage in which the couple lives with the husband's community
Polygamy	Marriage in which concurrently a man has more than one wife
Postpartum	The period beginning immediately after the delivery of a child until menses start again. The extended postpartum period refers to the first year after birth.
Tubal ligation	Female sterilisation
Total fertility rate	The number of live births a woman would have if she were subject to the current age-specific fertility rates throughout her reproductive years (15-49)

Section I: Background Materials

1 Background and Introduction

1.1 Motivational statement by the candidate

“The 21st century is a critical period for people and the planet. The global population reached 7 billion during 2011 and the United Nations projections indicate that it will reach between 8 and 11 billion by 2050. Human impact on the Earth raises serious concerns, and in the richest parts of the world per capita material consumption is far above the level that can be sustained for everyone in a population of 7 billion or more. This is in stark contrast to the world’s 1.3 billion poorest people, who need to consume more in order to be raised out of extreme poverty... The highest fertility rates are now seen primarily in the least developed countries... The global rate of population growth is already declining, but the poorest countries are neither experiencing, nor benefitting from, this decline” page 7 [2].

There has been a growing interest in the complex relationship between poverty, population, and the environment[2-8]. It is not possible for both population and consumption to continue to increase indefinitely on a finite planet, and presumably there are limits and tipping points[9]. It is therefore difficult to see a bright future for the poorest parts of the world, in a context of unprecedented population growth and degradation of the natural environmental resource base. High fertility rates still persist in the poorest parts of the world, most notably sub-Saharan Africa, where the total fertility rate still remains over 5[10].

I became interested in these issues over the last twelve years and this led me to work in a number of areas: environment, climate change, food security, global health, demography and family planning programmes.

The Royal Society report on “People and the Planet” (2012) from which the above quotation comes, identifies three urgent challenges that deserve attention, one being that global population growth needs to be slowed and stabilised, and that this must not be coercive. A number of theories of the drivers of the fertility transition have been posited, and the availability of effective methods of contraception is a common theme in these theories.

There are also many other factors involved with fertility decline, for example declining child mortality, economic factors, and the diffusion of new ideas (e.g. about contraception, or the advantages of having smaller families) through a population [11-16]. Fosterage, patrilineality, polygamy and communal land tenure have all been shown to promote fertility, as they give rise to situations where the cost of rearing one’s children is shared out beyond the immediate parents[17-20]. High fertility rates then become the norm, and persist because the norm is hard to break.

Programmes aimed at changing cultural practices that encourage high fertility norms may not only be hard to define and potentially ineffective, but new approaches are difficult to plan in the face of ethical issues. Family planning programmes on the other hand are a tangible intervention that can be scaled-up relatively quickly compared to other approaches for tackling high fertility. Providing access to voluntary contraceptive services is also important not only because of the direct impact on reproductive health outcomes, but also because contraception is thought to be on the causal pathway to improvements in health and socio-economic outcomes[21-23]. Measuring whether family planning programmes have an impact on fertility, and the scale of this impact, is a very important aspect of evaluating this kind of intervention. There is a need to better understand a) the drivers of fertility decline, b) the relationship between fertility intentions (the reproductive plans that women and men make) and resulting fertility, and c) the role and importance of contraception.

Prior to my PhD, I was living in Malawi, working on family planning programmes. I saw first-hand not only the destruction of the environment around me (from farming pressures to produce enough food on the fragile land, to over-fishing of Lake Malawi, to the felling of forests), but also the throngs of children and the typically young age that women start reproducing. It was with these experiences and my professional demographic background, that I embarked on a PhD to explore in more depth the relationship between fertility intentions, contraception, and fertility.

1.2 Family planning and the international agenda

It is estimated that around 222 million women in developing countries would like to delay or stop childbearing but are not using any method of contraception[24]. Family planning has been relatively neglected by the international development community in recent decades[25, 26], but is now back on the agenda, with growing impetus provided by the Family Planning 2020 (FP2020) movement[27, 28]. A goal was agreed at the July 2012 London Summit on Family Planning to enable 120 million more women and girls to access modern contraceptives by 2020[27, 29].

The “(modern) contraceptive prevalence rate” (CPR) is the name given to the indicator of the proportion of women of reproductive age who report they are using (or who report their partner is using) a (modern) method of contraception at a particular point in time. It is the most widely used and valuable measure of the success of contraception programmes, and is a tracking indicator for Millennium Development Goal 5 target 5B to “achieve universal access to reproductive health by 2015”[30]. It is the first of 15 indicators that 69 countries will annually report for FP2020[27], and it is commonly used for other evaluations of trends and comparisons. It is typically captured in surveys such as the Demographic and Health Surveys (DHS), Multiple Indicator Cluster Surveys (MICS), and other large-scale national surveys, using the question “Are you currently doing something or using any method to delay or avoid getting pregnant?”

1.3 The fertility-contraception puzzle in Malawi

Women in Malawi bear on average 5.7 children, and many pregnancies are unintended or occur sooner than desired. Although 42% of married women report using modern methods of contraception in cross-sectional surveys, the total fertility rate (TFR) remains high and 26% of women are estimated to have an unmet need for contraception for either spacing or limiting births [1]. Figure 1.1 shows that despite a significant increase in reported contraceptive use in married women over the last twenty years, there has been only a small decrease in fertility.

Figure 1.1 Trends in contraception and fertility in Malawi

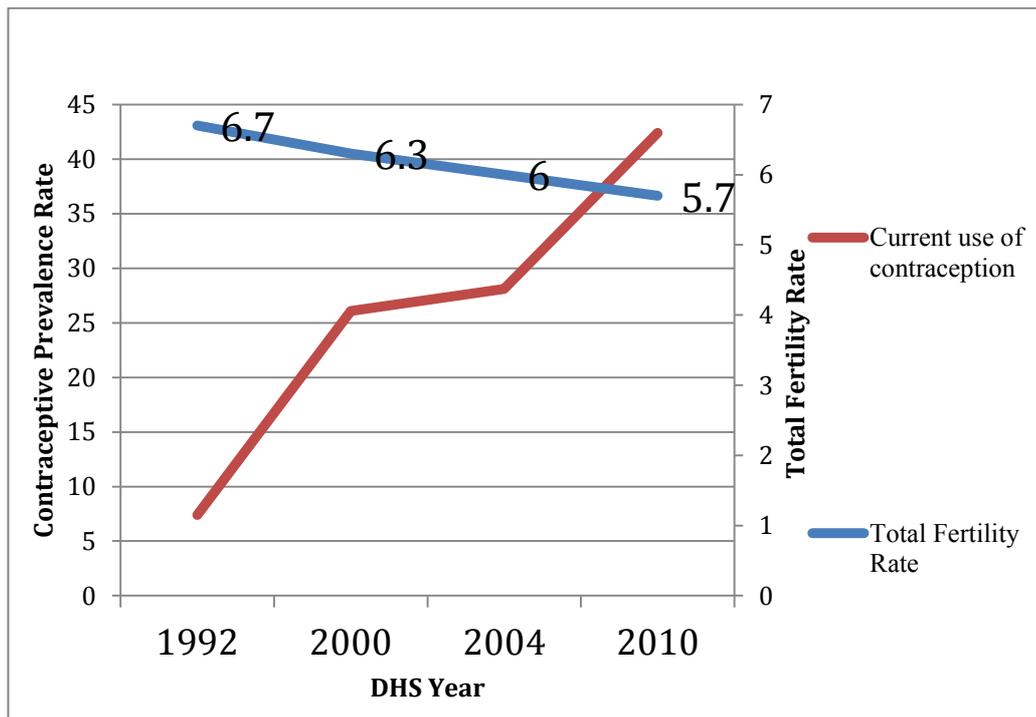
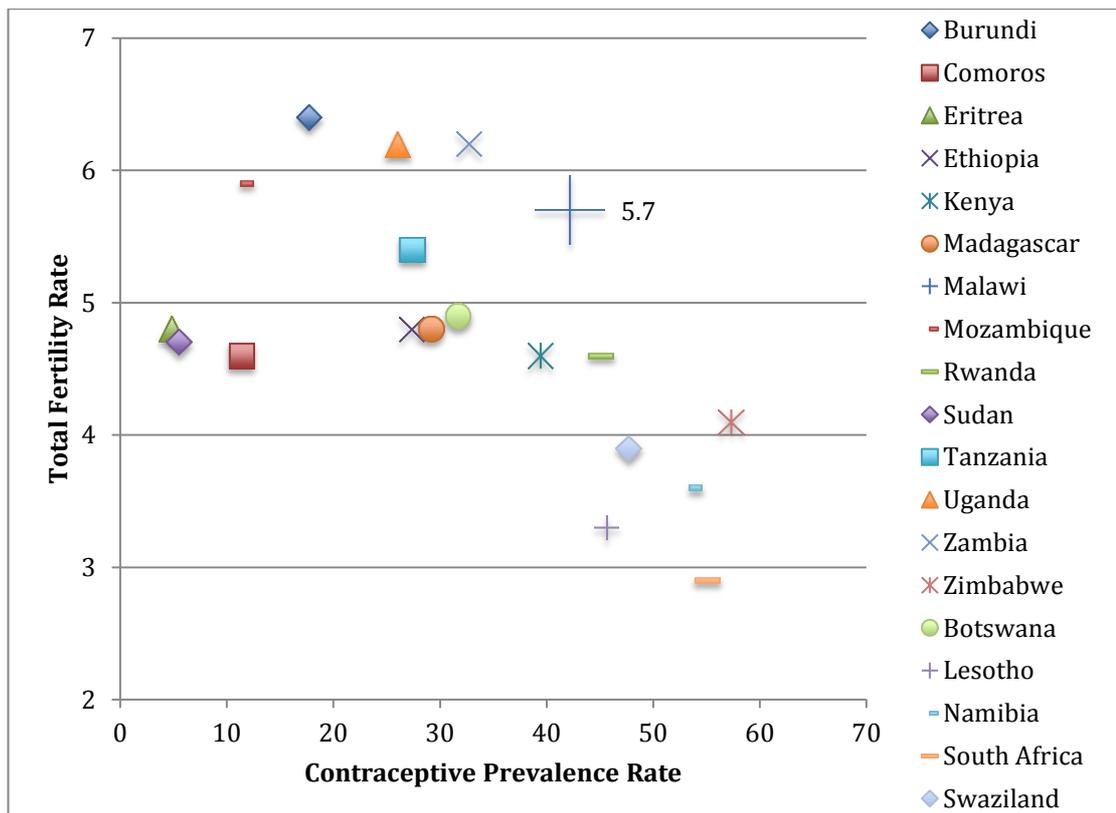


Figure 1.2 plots the most recent total fertility rate against CPR for countries in southern and eastern Africa that have undergone a demographic and health survey. There is an appreciable negative relationship: when CPR is low, TFR is high. Compared to the other

countries presented, Malawi's total fertility rate of 5.7 appears to be high given the level of contraceptive use (indicated by the large blue cross).

Contraception is a determinant of fertility[31], but there are other factors involved. Comparing Malawi to other countries in sub-Saharan Africa, the proportion of women who are married and living with their husbands is one of the highest, and it is lower in countries where there has been greater fertility decline[32], suggesting that spousal separation may be a driver of fertility decline. The same analysis also found that compared to other countries in the region, the median age of sexual debut, first marriage and first birth is young[32], demonstrating the potential importance of other proximate determinants of fertility.

Figure 1.2 TFR by CPR for countries in southern and eastern Africa, DHSs



There are a number of possible explanations for Malawi's paradox of high fertility despite increased contraception use. Firstly, other proximate determinants of fertility may be coming into play, e.g. short periods of exclusive breast-feeding, early age of sexual debut

and marriage (median age of first marriage is 19). Secondly, whereas CPR is estimated cross-sectionally the DHS uses births from the past five years to calculate TFR, so any increase in CPR might only be reflected in the TFR indicator a few years later. Thirdly, an ecological fallacy could arise if contraception is more commonly used by those at low risk of pregnancy (e.g. older women, women experiencing postpartum amenorrhea, or those who have sex less frequently) so that non-users contribute a disproportionately high number of births. Or fourthly, there may be over-reporting of either fertility or contraception. For example, a woman might consider herself to be a contraceptive user and respond positively that she is using contraception, even if she is in reality late for a repeat visit of e.g. injections or pills and thus has essentially discontinued a short-term method. It might be that there is something different about provision of contraception services in Malawi (perhaps stock-outs are more common), meaning women are more likely to miss repeat appointments, and might over-report their effective contraception use. Or, Malawian women may have learned what is the desirable response, as a result of multiple provider-initiated family planning conversations.

One way of assessing the validity and reliability of contraceptive data is to compare linked husband and wife reports, and identify any discrepancies [33, 34]. Typically, husbands report higher levels of contraceptive use than their wives[34]. A finding from Malawi suggests that when couples disagree on a range of issues in surveys (e.g. on household items, livestock, children and family planning), it is typically the husband who responded “yes” and the wife who responded “no”[35]. Another study finds relatively close agreement over reports of contraceptive use among monogamous couples, but shows that there are more discrepancies in polygamous unions[36]. It is possible that both under and over-reporting could be taking place, and in the Malawi context it could be that over-reporting is more common. According to the Malawi DHS, only 5% of contraceptive users have not told their husbands they are using contraception. This suggests if the majority of women are apparently open with their husbands about their contraceptive use, they may be less likely to deflate their reported contraception-use to an independent interviewer.

It is important to measure accurately rates and trends of contraceptive use, if we are to evaluate progress made towards targets such as Millennium Development Goal 5 to improve maternal health [23, 24, 37], but if the methods used to collect these metrics are flawed, it is hard to make sense of the data. Although Demographic Health Surveys exercise very high standards, they are nevertheless subject to error, and surveys conducted in sub-Saharan Africa tend to be more prone to errors than elsewhere [38, 39]. This calls for an exploration of alternative methods to evaluate contraceptive use.

With this puzzle in mind, this thesis will experiment with innovative methods to collect contraceptive use data, explore contraceptive behaviours in Malawi, and consider why the significant increase in use has not been translated into notably reduced fertility.

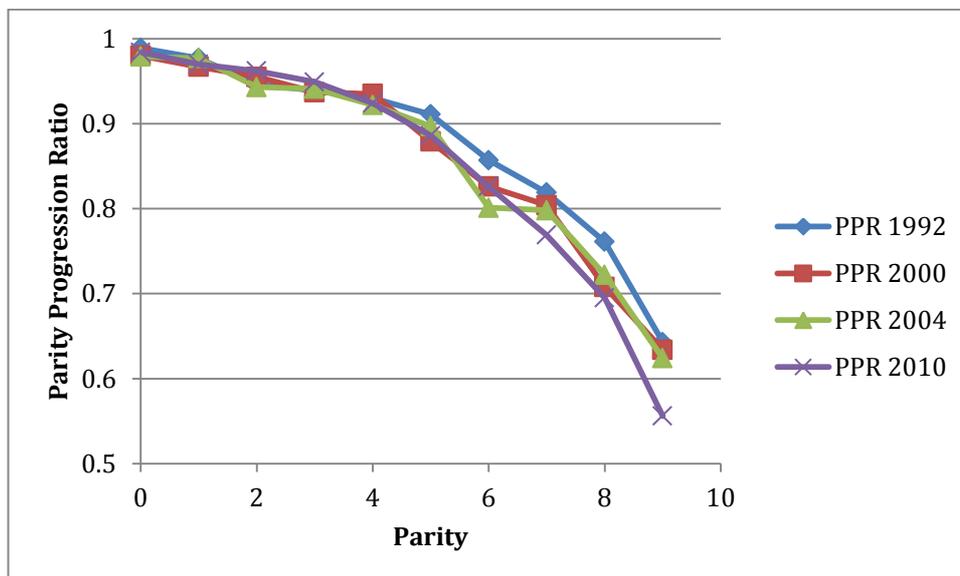
1.4 The spread of fertility

The spread of fertility may be an unaccounted dynamic in the contraception-fertility nexus. For example, overall fertility could remain stagnantly high even in a context of high contraceptive use, if those who use contraception are at relatively low risk of conceiving for other reasons (age, partnership status), so that those who are not using contraception contribute a disproportionately high number of births. Parity progression ratios (PPR) look at the proportion of women who increase their parity by at least one more child, and help to provide more information on childbearing trends and changes in the parity distribution of fertility. I examined trends in parity progression ratios across four Malawi DHS cohorts for women age 45-49 who have completed their reproductive lives, to explore if the probability of having another birth decreases over time, for different parities (Figure 1.3). Using DHS data on children ever-born, the number of women age 45-49 with at least N children was calculated, and the parity progression ratio was determined:

$$\text{PPR} = (\text{Women with at least } N+1 \text{ children ever-born}) \div (\text{Women with at least } N \text{ children ever-born})$$

Declines in the PPRs at different parities reflect changes in the spread of fertility. For parities 0-4, there is not a clear decline in PPR, suggesting there is not a decrease in fertility at these parities. The slight decline in higher-order PPRs from parity 5 upwards, suggests parity-independent fertility changes, such as a change in the duration of breastfeeding or age of marriage. Alternatively it could suggest that women only start to take contraception seriously when they get to parity 5+, perhaps electing for a sterilisation. A decline in middle-order parities (say, 3-5) would have reflected the impact of parity-specific contraception, but this is not clearly seen.

Figure 1.3 Trends in parity progression ratios (PPRs), DHSs, Malawi



1.5 Study context

1.5.1 Malawi: geography, history, politics, economy

Located south of the equator, Malawi is a tropical landlocked country in sub-Saharan Africa bordering Tanzania, Mozambique, and Zambia. There are three regions (north, central, south), and 28 districts, which are divided into Traditional Authorities, led by chiefs[40]. Traditional Authorities are composed of villages, presided over by village headmen/women. Malawi gained independence from Britain in 1964 and held its first multi-party elections in 1994. The economy is predominantly based on agriculture, and the main exports are tobacco, sugar, and tea. It is a food insecure country as a result of frequent crop failures.

1.5.2 Malawi: demographic, health and social profile

The latest census estimated the intercensal population growth rate to be 2.8% per year, reaching a total population of 13.1 million in 2008[41] of which only 6 million were aged 18 years or older, demonstrating a youthful age distribution, and 85% were estimated to live in rural areas[41]. If this growth rate continued the population would have been well over 15 million in 2013.

Under-five mortality is 112 per 1000 live births, and the maternal mortality ratio is 675 per 100,000 live births, in 2010[1]. For women age 20-49, the median age at first sexual intercourse is estimated at 17.3 and median age at first marriage is 17.9. Breastfeeding is very common, and 71.4% of infants under 6 months are exclusively breastfed, with the median length of exclusive breastfeeding lasting for 3.7 months[1]. Abortion is legally restricted in Malawi, but it is estimated that 23 induced abortions per 1,000 women aged 15-44 were performed in 2009, equivalent to an abortion ratio of 12 per 100 live births[42-44].

Malawi is a poor country and the UN Development Programme ranks Malawi 170th in the world (out of 186) for human development index[8]. In rural areas, 2% use electricity for lighting, and 96% use firewood for cooking, according to 2008 data[41]. The northern region is the most rural of regions, but has the highest literacy and education indicators[1]. English is the official language, and Chichewa is the national language. In the northern region, 96% of the population are Christian, and 1% Muslim[41].

1.5.3 Study setting: Karonga Prevention Study

The Karonga Prevention Study (KPS) operates a demographic surveillance site (DSS) in Karonga district, northern rural Malawi on the coast of Lake Malawi, and the population (36,524 individuals in 8,076 households at the end of 2012[45]) has been under continuous surveillance since 2002. Key Informants – who are village residents – report vital events to KPS in a monthly reporting session, and an annual re-census verifies the data and estimates annual net migration[45, 46].

The main economic activities in the area are farming, fishing and small businesses. The population is predominantly Christian, and Tumbuka speaking. The median age of first sex is 17 and first marriage is 18, and the onset of childbearing is early with 90% of all 20-24 year old women having at least one child. From HIV sero-surveys, HIV prevalence in the KPS area is estimated at 7% of adult males and 9% of adult females[47].

The community is patrilineal and residence is typically patrilocal[48]. 15% of men and 27% of women were in a polygamous marriage in 2009[49], although the life-time experience of polygamy is higher. Divorce is common, but re-marriage is also very common, and often quick[50]. A missionary writing about the Tumbuka in the 1930s describes how it was thought that a good village should have many people, and that growing numbers was important for strength and prestige. He explains that this thinking was due to the threat of de-population, slave trade kidnappings, murder by invading groups, food

shortages, and disease[48, 51]. The emphasis on promoting a large population in a village may still persist, even if the threats have since been removed.

2 Study process

2.1 Structure of thesis

This thesis is submitted in a “research paper” format, and is built around nine chapters. Five results manuscripts (Papers A-E which are presented in Chapters 4-8) have been prepared, four of which (Papers B-E in Chapters 5-8) contain papers for consideration by peer-reviewed journals. On occasion, there is some repetition of background material in the papers so that each article can be understood independently of the thesis. For ease of reading this thesis, the formatting of the papers has been incorporated to this one body of work: so that table/figure numbers and references are incremented and unique within the thesis. The required cover sheet is included in each of the chapters containing the papers, and on occasion additional details are presented that are not included in the article, but may be submitted as electronic appendices, where journals allow. A summary of the methods used by the different studies is provided in Chapter 2, but there is no dedicated methods chapter in this thesis. This is because Chapter 5 is a methods paper describing in detail the approach of the large quantitative study undertaken for this PhD work. Qualitative study methods are detailed in Chapter 7.

SECTION 1: Background material

Chapter 1: Presents the background and motivation for exploring issues around contraception, fertility intentions, and fertility in Malawi.

Chapter 2: Explains the study process, including logistics and arrangements to facilitate the work.

Chapter 3: A literature review goes into more depth about what is already known on contraception issues in Malawi, and contraceptive switching and discontinuation.

SECTION 2: Results

Chapter 4 (Paper A): A secondary analysis of KPS data is presented exploring the issue of whether women operationalize their fertility intentions: Do rates of birth conceptions vary by previously stated fertility intention? The reader will see that there are high rates of conceptions even amongst women who claim to want no more children, and amongst women who use short-term methods of contraception. The findings from this paper set the scene and present the motivation for my PhD field-work that is presented in Chapters 5-8.

The following four chapters (5, 6, 7, 8) are based round manuscripts that have been prepared for publication in peer-reviewed journals. Table 2.1 summarises the status of the four manuscripts with regards to journal submission and peer-review process.

Chapter 5 (Paper B): This is the first of the three manuscripts based on a longitudinal quantitative study, which was the major component of my PhD work. It describes the innovative methods that were deployed for conducting this quantitative study, the findings of which are presented in Chapter six and Chapter eight.

Chapter 6 (Paper C): This manuscript uses the quantitative data to show that women in the study area typically use contraception inconsistently, which is likely to be a contributing reason for the high birth rate. An estimate of the *actual contraceptive prevalence rate* (a new term developed for this thesis, calculated using provider-recorded data) is given.

Chapter 7 (Paper D): Describes the *reasons* for the haphazard contraception use, using data from a qualitative study.

Chapter 8 (Paper E): This is the last of the research papers, and uses data from the quantitative study in order to explore uptake of postpartum family planning, which is a critical window in which to target women with contraception services.

SECTION 3: Summaries and conclusions

Chapter 9: This draws together the findings from, and implications of, the five papers, discusses the strengths and limitations of the studies, and suggests service and policy recommendations and areas for future research.

Table 2.1 Status of papers

Chapter	Paper	Status of paper	Other notes
5 (Paper B)	The potential of patient-held records in reproductive health research	Submitted in August 2014 to WHO Bulletin “Lessons from the field”. However, a longer version of the paper – which had been prepared with “Demographic Research” in mind, is presented in this thesis.	A long abstract which was a combination of these two papers was peer-reviewed and accepted for oral presentation at the International Union for the Scientific Study of Population (IUSSP) International Conference, Busan South Korea, Aug 2013.
6 (Paper C)	Contraceptive dynamics in northern rural Malawi: A prospective longitudinal study	Will be submitted to Studies in Family Planning	
7 (Paper D)	Inconsistent contraceptive use in northern Malawi: Perceptions and expectations of rural women	Will be submitted - after PhD completed - possibly to Social Sciences in Medicine	
8 (Paper E)	Postpartum uptake of contraception in rural northern Malawi	Paper to be presented at IUSSP Seminar in Nov 2014, Cochin India. Comments from the Seminar will be incorporated and then the paper may be published as part of an IUSSP series.	Long abstract peer-reviewed and accepted by IUSSP Scientific Panel on Reproductive Health, for Seminar on “Promoting Postpartum and Post-abortion Family Planning – Challenges and Opportunities”.

2.2 Study objectives and aims

This thesis aims to examine the complex relationship between fertility intentions, contraception, and births, using a combination of: a) existing data on fertility intentions and births captured by the KPS Demographic Surveillance Site; b) innovative quantitative methods to collect contraception data using patient-held records; and c) qualitative methods. Table 2.2 lists the key objectives and outlines the analysis methods that will be employed.

Table 2.2 Study Objectives

Objectives	Methods
1. To explore whether women operationalize their fertility intentions, and achieve their reproductive goals	<u>Quantitative</u> <ul style="list-style-type: none"> • Use event history analysis to examine existing KPS data on prospective fertility intentions and births. Calculate conception rates by previously stated fertility intentions (Chapter 4).
2. To examine the extent to which women use contraception consistently	<u>Quantitative</u> <ul style="list-style-type: none"> • Collect new contraceptive data using patient-held records, and link to the KPS database (FP card study) (Chapter 5). • Calculate the <i>actual contraceptive prevalence rate</i> using provider-recorded data, and use survival analysis to explore the distribution of time to discontinuation (Chapter 6). Explanatory variables include age, parity, education, HIV, marital status and fertility intentions. • Examine time to uptake of contraception for postpartum women (Chapter 8).
3. To understand reasons for contraceptive choices and changes	<u>Qualitative</u> <ul style="list-style-type: none"> • In-depth interviews (IDI) with women to explore reasons for contraceptive behaviour (switching/ discontinuation), and motivating/ facilitating-factors and barriers to use (Chapter 7).

2.3 Summary of the study methods

All data analysed for this thesis were collected through the Karonga Prevention Study. Table 2.3 summarises the study methods for the related studies. I carried out two new studies of contraceptive use: one quantitative and one qualitative (numbers 1 and 2 in Table 2.3). Because of a number of related studies that had taken place prior to my PhD work, I was able to make use of existing KPS data (numbers 3 and 4 in Table 2.3), in order to build a richer picture of the issues around sexual behaviour, contraception, and fertility in the study area. Therefore, the different studies and approaches that are presented in this thesis

are closely related and help to address the research questions. Paper B (Chapter 5) presents in detail the study methods for the quantitative family planning card study. A section of Paper D (Chapter 7) covers the methods used for the qualitative study.

Table 2.3 Studies carried out at KPS that contributed data towards the thesis

Study	Data Collection	Methods	Chapters using data
1. Family Planning Card Study - Quantitative	January 2012-May 2013	All women aged 15-49 living in the DSS were invited to participate in a one-year prospective study. Health care providers recorded contraceptive data on patient-held records (“family planning cards”) that were kept in women’s health passports.	Chapter 5 Chapter 6 Chapter 8
2. Family Planning Study - Qualitative	February 2013-May 2013	In-depth interviews carried out with 19 purposely selected women, who represented a range of personal characteristics and contraceptive use. Interviews lasted roughly one hour, and followed a semi-structured topic guide. A second interview was held on five occasions.	Chapter 7 Chapter 8
3. Demographic Surveillance Study (DSS)	On-going since 2002	A baseline census was conducted in 2002-2004, and continuous demographic surveillance of vital events (births, deaths) and migrations for individuals and households has taken place since then. A network of village informants notifies KPS monthly of vital events, and reports migrations annually, at an annual update session. The DSS provides a platform and sampling frame for other studies. It has the capacity to re-identify individuals who move house, and link children to parents. At the end of 2012, there were 36,524 individuals living in 8,076 households under observation. GPS coordinates of all households in the DSS allow for a calculation of distance-to-road, and distance to family planning provider.	Chapter 4 Chapter 8
4. Multi-round Sexual Behaviour Survey	August 2008 – August 2011	Three rounds of population-based adult sexual behaviour surveys amongst women aged 15-59, taking one year to complete the survey area. The interviews took place approximately one month after the annual re-census of that area. Women were asked questions in Tumbuka on a number of topics including marital status, educational attainment, current use of contraception, and prospective fertility intentions.	Chapter 4 Chapter 5 Chapter 6 Chapter 8

2.4 Role of the Candidate

For the quantitative study on contraception (Chapters 5, 6, 8), I designed the study and wrote the detailed protocol with support from my supervisors and feedback from field-workers, wrote the ethics and funding applications, monitored the budget, designed and prepared the data collection materials (family planning cards, information sheet, consent forms etc.), managed the logistics of data collection and data-entry, and analysed the data. Field-workers who are employed by the Karonga Prevention Study, Key Informants who are volunteers at KPS, and local health care providers carried out the field-work, with training and supervision from myself (I also prepared the training materials). I also engaged closely with the district family planning coordinator, in order to obtain her support for the research. The KPS data-entry clerks conducted all the data entry. A senior data manager who works for KPS designed the data-entry programme for the quantitative study. I cleaned and linked the datasets in Stata. Supervisors Amelia Crampin and Basia Zaba guided me on the analysis approach.

For the qualitative study (Chapter 7), I designed the study, prepared the topic guide, information sheet and consent forms, prepared the funding and ethics applications, managed the grant, and trained interviewers to conduct the in-depth interviews. The interviewers fed back their observations and suggestions and the topic guide was adjusted accordingly. I met with the interviewers after each interview in order to discuss emerging themes, supervised data collection and planned for subsequent interviews, and also trained the interviewers to transcribe and translate the interviews. I carried out one of the focus group discussions, in order to train the interviewers to conduct the remaining focus group discussions. I analysed the qualitative data, with guidance from co-supervisor Susannah Mayhew.

Data on births, migrations, socio-economic status, fertility intentions, marriage, HIV status etc., all come from the existing KPS database. KPS collected these data as part of the research programme, which includes operating a demographic surveillance site and conducting HIV sero-surveys, multi-round adult sexual behaviour and socio-economic

studies. I used these existing data as part of my quantitative analyses either to provide explanatory variables (for Chapters 5, 6 and 8), or as part of a body of research on the existing data (Chapter 4).

In order to prepare papers from the research for publication, I wrote drafts of all the papers presented in this thesis, and incorporated comments from the co-authors.

2.5 Collaborating institutions

As a result of my links to multiple collaborating institutes (LSHTM, College of Medicine, KPS), I capitalised on a number of opportunities that came my way, in order to develop a range of skills and foster relationships between institutions.

I am a PhD student at the London School of Hygiene and Tropical Medicine, which is where I received my main teaching and Supervision. My main supervisors are Basia Zaba, a Demographer with expertise in HIV and demographic surveillance systems in Africa, and Amelia Crampin, an epidemiologist with expertise in TB, HIV and non-communicable diseases and 15 years field experience in Malawi. Susannah Mayhew (interests in health policy in relation to sexual and reproductive health services) provided supervision on qualitative work. LSHTM also provided access to library, IT and training resources. I taught on a LSHTM Distance Learning epidemiology course during 2014.

I was a Visiting Research Fellow at the College of Medicine (COM) University of Malawi in Blantyre, as part of my collaborative arrangements with the Leverhulme Trust. The COM provided a desk in Blantyre, and other resources (library, IT support). Frank Taulo (an obstetrician/gynaecologist with experience on sexual and reproductive health matters in Malawi) and Bagrey Ngwira (an epidemiologist with experience at KPS) of the College of Medicine both served informally as advisors at the COM.

All field-work was conducted at the Karonga Prevention Study (KPS), an LSHTM research site in northern rural Malawi with core funding provided by The Wellcome Trust. KPS allowed me to use the existing infrastructure – accommodation, finance & logistics

teams, field-workers, data entry operations etc. – so that I could conduct my research. I received advice and support from the senior LSHTM staff who work there. As a result of my close working relationship with KPS, I became involved in a number of other activities with KPS. These included designing the study protocol and developing the data collection tools for a study on retention in an Option B+ Prevention of Mother to Child Transmission programme, carrying out a review of Malawi’s HIV policies for a six-country comparison, and setting up and running a journal club.

2.6 Funding

I was supported by a two-year Leverhulme Study Abroad Studentship, which covered maintenance expenses and tuition fees for 24 months. I was also awarded a small grant by the Parkes Foundation. In order to self-fund living expenses and tuition fees for the additional 18 months of the PhD, I worked part-time as a consultant on a number of projects and studies, for the ALPHA (Analysing Longitudinal Population-based HIV/AIDS data on Africa) Network (May 2013-April 2014), Southampton University (January-June 2013), Marie Stopes International (September-October 2013), and The BMW Guggenheim Lab (February 2012-January 2013), and taught on the LSHTM Distance Learning course “Writing and Reviewing Epidemiological Papers” for MSc Epidemiology.

A MEASURE Evaluation Population and Reproductive Health Associate Award from the University of North Carolina (UNC) at Chapel Hill, and KPS jointly funded the quantitative family planning card study. The UNC grant was administered by the College of Medicine (COM), University of Malawi, who subcontracted KPS to do the work. The Leverhulme Trust granted funding for the qualitative family planning study.

2.7 PhD time-line

An overview of the time-line of activities is presented in Table 2.4. I spent the first 3 months full-time in London, and thereafter was based in Malawi, with multiple visits to the UK every year, amounting to around 10 months spent in the UK overall. The quantitative study was carried out first as this study had the longest duration, followed by the qualitative study. Preliminary findings from the quantitative study also helped to guide the design and research questions for qualitative study.

2.8 Ethical considerations and clearance

Ethical approval for the combined quantitative and qualitative studies was granted by The LSHTM Ethics Committee (reference number 6082) and the College of Medicine Research and Ethics Committee (COMREC) (reference number P.09/11/1157) (Appendices C and D).

Prior to data collection, community sensitization activities were undertaken. For the quantitative study, informed consent was obtained by KPS staff when they *collected* the family planning (FP) cards. The study, how KPS planned to use the data, and the potential benefits and risks of submitting the card were explained to women, and informed written (signature or thumb-print) consent was taken. Consent and refusal was recorded on the Consent Form and in the Master list of participants. The FP card was designed to sit discreetly in the health passport so as not to draw undue attention from husbands.

For the qualitative study, informed written consent (signature or thumb-print) was sought *prior* to conducting the interview.

All consent forms are retained for KPS records. Any individual who was too ill to consent or was unable to understand the consent process, was not included in the study.

2.9 Data management and analysis

The management process for all data collected as part of this PhD was integrated within the existing, secure KPS data management system. All KPS data and data backups are held on a restricted access local area network drive with additional authorisation layers for highly confidential data such as HIV results. Individuals downloading data for analysis hold the data in password protected secure files, using the programme “Truecrypt”.

All individuals can be identified regardless of their current household and residence; every individual is assigned a unique number called “ident”, which allows linking of data on that individual within the database. For the quantitative data, linkage of the new

contraception data to the existing database – restricted to authorised personnel – was needed for analysis.

The registration list for the quantitative study was single-entered by a data-entry officer into a registration Microsoft Access© file. Checks were run on the registration to ensure that data for all women had been entered. The same protocol was followed a year later when the collection registration list was generated and completed.

On collection of the FP cards, the cards were double-entered by two data entry officers into Microsoft Access© files. These two Access files were verified against each other to identify and then correct any discrepancies. The data entry screen was programmed to facilitate data entry accuracy (e.g. drop down boxes to select contraception method), and consistency checks were run (e.g. to check that the FP card issue date was earlier than the FP card collection date). Quantitative data were analysed using Stata 12 (StataCorp 2011).

For the qualitative work, a de-briefing session was held with the interviewer after each interview in order to identify emerging themes, clarify ambiguities, and prepare notes summarising the interview while the interviewer's memory was still fresh. The interviews were transcribed (using the audio recording and interviewer's notes), then translated into English for manual data analysis. The interviewer checked the translation for one transcript from each of the translators in order to identify any problems with the translations. I discussed queries from the transcripts with the interviewers and translators in order to understand their meaning. As with quantitative data, the qualitative data are stored in password-protected files.

3 Literature Review

A review of papers regarding family planning (FP) in Malawi was carried out, as well as a broader review covering articles on contraceptive discontinuation and method switching in any country – topics relevant to this work but generally found in publications that do not refer specifically to Malawi.

3.1 Search strategy for literature review on family planning in Malawi

Five databases were used to search for articles on family planning in Malawi, using key text words to focus the search. The five databases were:

1. Global Health – good international coverage of public health issues
2. Web of Science – to capture articles in the social sciences that might not fall under the more health-related databases
3. Medline – to capture articles published in north American journals
4. Embase – to capture articles published in European journals
5. Africa-Wide Information – to find the more Africa-specific biomedical literature

Relevant articles found through the following methods were also included:

- Reviewed the reference list of included articles
- Searched through grey literature from organizations working in the field of sexual and reproductive health some of which operate in Malawi
- Recommended sources by experts in the area. Having previously worked in the area of FP in Malawi, some sources come from my own experiences.

3.2 Family Planning in Malawi

3.2.1 Changing official attitudes to family planning and service provision

Both public and private sectors provide family planning (FP) in Malawi[52]. Government hospitals and health centres, Christian Health Association of Malawi (CHAM) facilities, and nongovernmental organizations such as Marie Stopes' Banja La Mtsogolo (BLM) provide services in static clinics and as outreach services. Some contraceptive supplies may be bought at pharmacies. Government health surveillance assistants (HSAs) provide the Essential Health Package including contraception in mobile clinics or health posts[53], and volunteer community-based distribution agents (CBDAs) provide FP counselling and basic services[53, 54]. Population Services International uses social marketing to sell the condom brand "Chishango".

Family planning was not always so openly and easily provided in Malawi. On Malawi attaining independence from British colonialism, Life-President Banda banned FP in 1964, despite foreign pressure to adopt a neo-Malthusian approach to population control. This rejection of external influence demonstrated Malawian intentions to pursue independent nation-building and preserve cultural traditions[55]. However, following a careful diplomatic campaign by Malawian medical elites, a moderate FP policy was adopted in 1982, packaged as a "child-spacing" programme[55, 56]. A more comprehensive FP approach was adopted in 1994, after the introduction of democracy, when President Muluzi was elected[55]. The National Population Policy (1994) was designed to reduce population growth to a level compatible with Malawi's social and economic goals. The objectives were to improve contraceptive and health care programmes, improve schooling, and employment opportunities. The Malawi Growth and Development Strategy (MGDS) was a five-year strategy launched for 2006-2011 and revised again for 2011-2016, to reduce poverty and this is an overarching development strategy for the country[57]. More recently, there have been

some conferences and reports addressing the concerns of population more directly[57-60], but with little resulting action.

Today, the most commonly used contraceptive method for married women in Malawi is the injectable “Depo provera” (26%), which provides 3 months of protection. The second most popular method is female sterilization (10%), followed by oral contraceptive pills (3%) and male condoms (2%)[1]. Although free contraception is provided at government health centres and facilities, hidden access costs include transport, registration and pregnancy testing fees. There is relatively good coverage of family planning services, although some rural women live too far from government services and may have to resort to private services, where these are available and affordable[52]. Stock-outs of contraceptive products occur, with increased frequency during periods of political and economic instability in Malawi (own observation).

Providing mobile contraceptive services increases accessibility for “hard-to-reach” groups. Some HSAs are trained to provide injectables[53], and volunteer CBDAs and Youth CBDAs provide pills and condoms, and counsel/refer clients to clinics for injectables, implants, and tubal ligation[61]. CBDAs and Youth CBDAs are an important supply source for rural Malawians who have little access to health facilities, however some have a preference for receiving FP at health facilities because of the wider range of methods, and increased privacy and confidentiality[62]. Women are expected to carry a “health passport” (patient held medical record) with them when they utilise health care services. Some health passports – but not all – contain a dedicated family planning page where the health care provider can record details of contraceptive services provided.

Heard (2005) found that a high density of contraceptive services was associated with FP use[63], but in an earlier analysis found no relationship between service proximity use after controlling for socio-economic and background characteristics[63, 64]. The strongest association with FP use among the distance variables they explored was proximity to youth-friendly services, demonstrating the importance of targeting this underserved population[64, 65].

Efforts to increase contraceptive use in Malawi include mass media communication (radio[62, 66], billboards, leaflets or printed messages), provision of contraceptive choice, and improvements to service quality and accessibility. Cohen (2000) used DHS 2000 data to assess the efficacy of these components in increasing contraceptive use, and found they played different roles for different segments of the population[56]. Mass media had a positive impact on FP use, as corroborated by Meekers and colleagues (2007) using DHS 2004 data. They found that the radio campaign had been heard by 85% of men and 60% of women surveyed, and that these individuals were more likely to discuss FP with their partner, although there was limited effect on condom-use[66].

To address the needs of an estimated 13% of women aged 15-49 living with HIV[1], the Ministry of Health directs that HIV services in Malawi should be integrated with FP and other reproductive health services. Health workers “should not actively discourage pregnancy” in HIV positive women (p30 in[67]), but provider-initiated FP counselling should encourage use of condoms and injectables for dual protection. In practice, HIV positive women who have more children are stigmatised, and some health care providers may push contraception. Conversely, the attitude that condom-use within marriage is not an appropriate FP method unless required for HIV control, is prevalent even among providers (own observation).

Abortion remains restricted in Malawi, legal only to save the life of the mother[68]. Nevertheless, unsafe backstreet abortions cause 18% of maternal deaths in Malawi[43]. Lema & Mpanga (2000) call for strengthening of FP services to reduce maternal deaths, avert unintended pregnancies that may result in unsafe backstreet abortions[69], and as part of post-abortion care to prevent repeat unwanted pregnancies[43].

3.2.2 Community attitudes to and demand for FP, and the effect of knowledge of HIV status

Focus group discussions (FGD) in Mangochi District (Southern Malawi) explored contraceptive knowledge, beliefs and attitudes, finding poor uptake despite good knowledge of modern methods of contraception[62]. Misinformation and misconceptions (e.g. that FP can damage body organs, or cause male impotence), fear of side-effects (e.g. prolonged menstruation), and lack of husband-approval were identified as problematic. Opposition to coercive population control by the Malawian government may have impeded condom and contraception uptake, and may be a source of rumours and misunderstandings today[70]. Women may resort to traditional methods of FP, use medicinal plants or wrap beads round the waist in an attempt to control fertility[48, 71].

Yeatman & Trinitapoli (2008) use data from the Malawi Diffusion and Ideational Change Project (MDICP), to argue that individual religious and community leaders influence FP use more than official religious doctrines[72]. This is evidenced by activist Reverend Msowoya encouraging Malawians to practice FP, arguing there is not enough land to support so many[73]. Yeatman & Trinitapoli suggest that women whose leaders talk more openly about sex and morality, are more likely to chat informally about sex and contraception with other women, gaining information to help with their own reproductive or contraceptive decisions, as posited by diffusion theory[11].

Paz Soldan's (2004) in-depth interviews (IDI) in Mangochi confirmed that women's knowledge of FP was gained from talking with other women, in discussions often started by gossiping[74], and this is corroborated by Gipson's work[75]. Interviewees described support and help between women, for example helping one another read the scheduled injection dates, or travelling to the health facility together.

Using data from the MDICP, Ntshebe (2011) showed that contraceptive use is associated with HIV concerns. The Karonga Prevention Study has shown that individuals who are HIV positive are less likely to want more children than HIV negative individuals[76]. This is corroborated by Hoffman and colleagues, who report that women's

desire for another child halved after receiving an HIV positive test, and contraceptive use increased from 38% to 52% one week after receiving the HIV positive result, although this was not long-lasting[77]. In later pieces of work carried out by the same team, it was found that age, education, duration of antiretroviral therapy (ART), pregnancy history and fertility intention are *not* associated with contraceptive use among HIV positive women, but that women who have an HIV positive partner, are in a monogamous marriage, and whose partner wanted them to use FP are more likely to be FP users[78]. They also argue that consistent exposure to health care providers and contraceptive messages post-partum is a good way to achieve high contraceptive use among HIV positive women[79].

However, condom-use within marriage is rare and deemed inappropriate. “Flesh to flesh” sex is considered important for a married couple (page 3 [80]), and condoms are associated with extramarital partnerships. Constraints on condom use in Malawi come from the perception that condoms say something about the user, their sexual partners and their sexual behaviour. Above all, condoms indicate something about the nature of the sexual relationship itself[81].

3.2.3 Women’s autonomy with regards to FP use and family building

Gender relations and husband-approval as a determinant of contraceptive uptake are recurring themes in many of the articles[35, 62, 66, 74, 82]. Involving men is a common strategy to increase FP uptake. Interventions to educate and train men to discuss with their wives the financial and health related benefits of FP resulted in an increase in FP use, and ease and frequency of communication within couples is an important predictor of uptake[83]. However, Gipson and co-worker’s IDIs and FGDs reveal how women may covertly use FP in order to avoid confrontation with disapproving husbands[75].

Gipson and colleagues argue that interventions involving men should be done extremely carefully, because existing gender norms do not lend themselves to couple-based

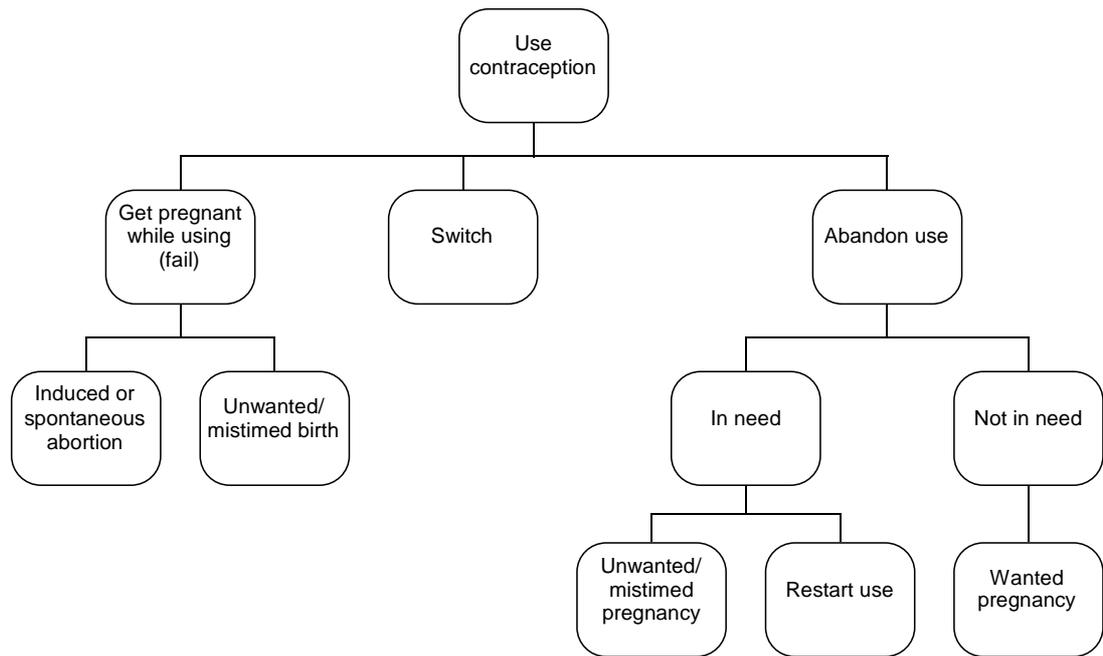
interventions on reproductive issues. They argue that involving a man in such discussions may invite him to disapprove of a wife's desire to use FP, whereas he would not have intervened if he had not been involved at all[75]. There are both patrilineal and matrilineal marriage communities in Malawi, and the lineage type may confer power in decision-making to either the man or the woman. In patrilineal marriage communities, husbands tend to dominate in decision-making for contraceptive use[82]. The authors suggest that when designing reproductive health interventions for couples, non-gender cultural scripts that focus more on, for example, welfare of children, open communication, and maintaining harmony, should be employed because non-gender shared approaches are also often used to rationalise a decision-making process.

3.3 Continuity of Family Planning

3.3.1 Family planning method/provider-switching, and discontinuation

In their seminal work in 1997, Curtis & Blanc developed a conceptual model of contraceptive use dynamics (Figure 3.1) – contraceptive failure, method switching, and discontinuation – and explain they are important to examine because as desired family size declines and contraceptive prevalence increases, contraceptive effectiveness and duration of use become increasingly significant determinants of total fertility, unintended pregnancies and induced abortions[84].

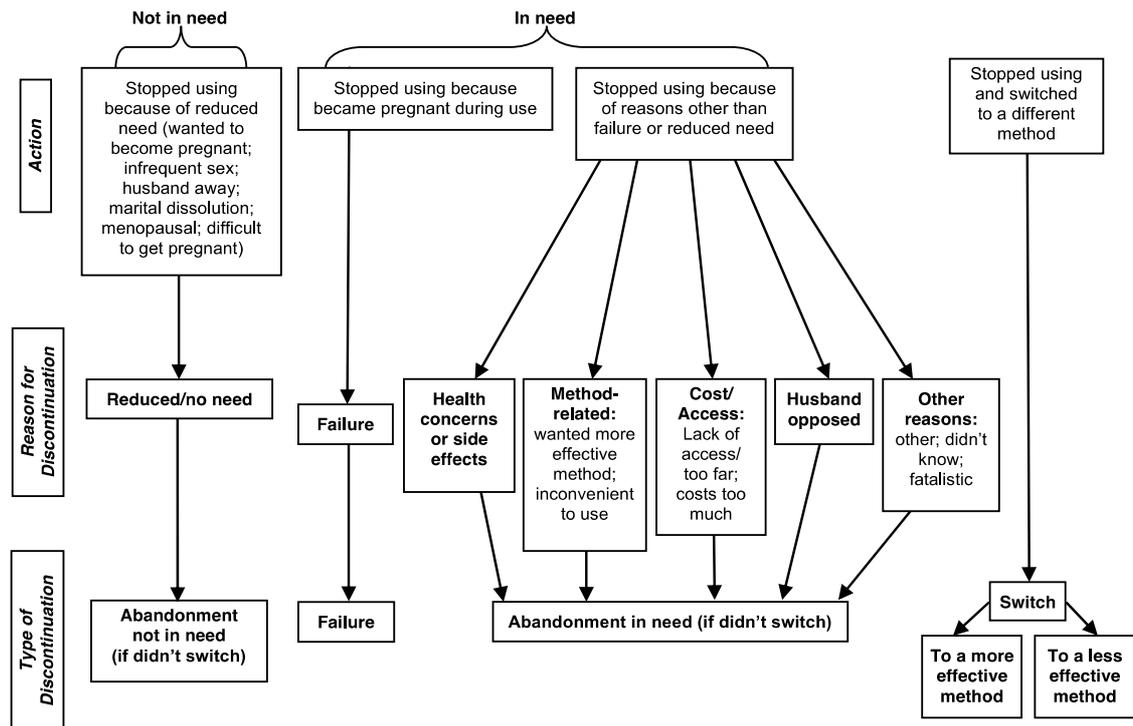
Figure 3.1 Contraceptive use dynamics of existing users



Reproduced from Curtis & Blanc (1997)[84]

Bradley and colleagues developed a framework examining discontinuation, which provides more detailed reasons for, and a wider range of types of, stopping[85] (Figure 3.2).

Figure 3.2 Model of family planning discontinuation



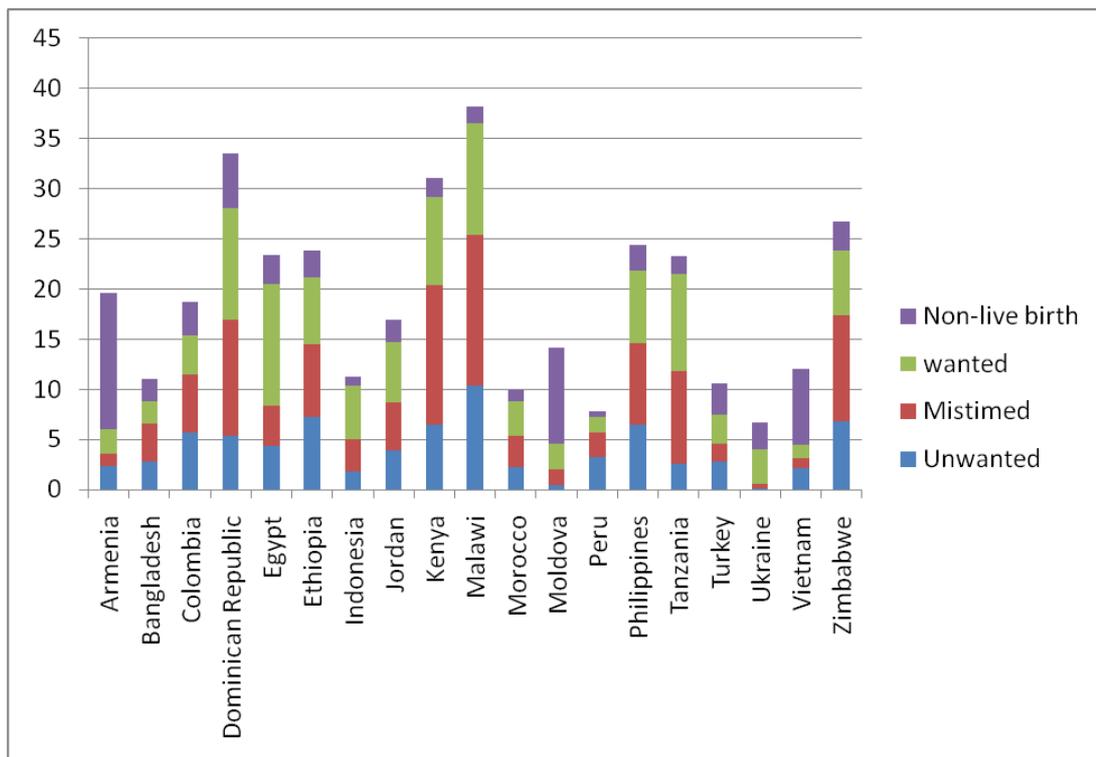
Reproduced from Bradley et al. (2009)[85]

Single-country non-DHS studies on FP switching or discontinuation are not very common, as the data tend to be difficult to collect and analyse. Thus, much of the work has been on cross-country comparative reports, often using data from the calendar section of the DHS questionnaire[84-92]. Contraceptive calendars capture a woman's retrospective self-reported contraceptive status (and method), pregnancies, births, breastfeeding and terminations every calendar month for the five years prior to interview. These data do not suffer from problems of loss to follow-up, although there is selection bias, as only women surviving to interview can report, and there are likely to be memory-recall issues. With the exception of this retrospective calendar method, conventional assessments of contraception are not always in a position to capture switching or discontinuation.

Contraceptive discontinuation is thought to be an important determinant of reproductive outcomes such as fertility[84, 93]. Ali and co-workers compared the reproductive outcomes within 12 months of method-related discontinuation for nineteen countries, using DHS data (Figure 3.3)[89]. Method-related discontinuation implies

dissatisfaction or problems with the method (e.g. side-effects), rather than desire for pregnancy or because of no further need. Over 25% of Malawian women who discontinued had a mistimed or unwanted birth within 12 months of discontinuation – higher than any of the other countries included in the analysis (using Malawi 2004 DHS). This demonstrates the impact of discontinuation on fertility.

Figure 3.3 Reproductive outcomes within 12 months of method-related discontinuation

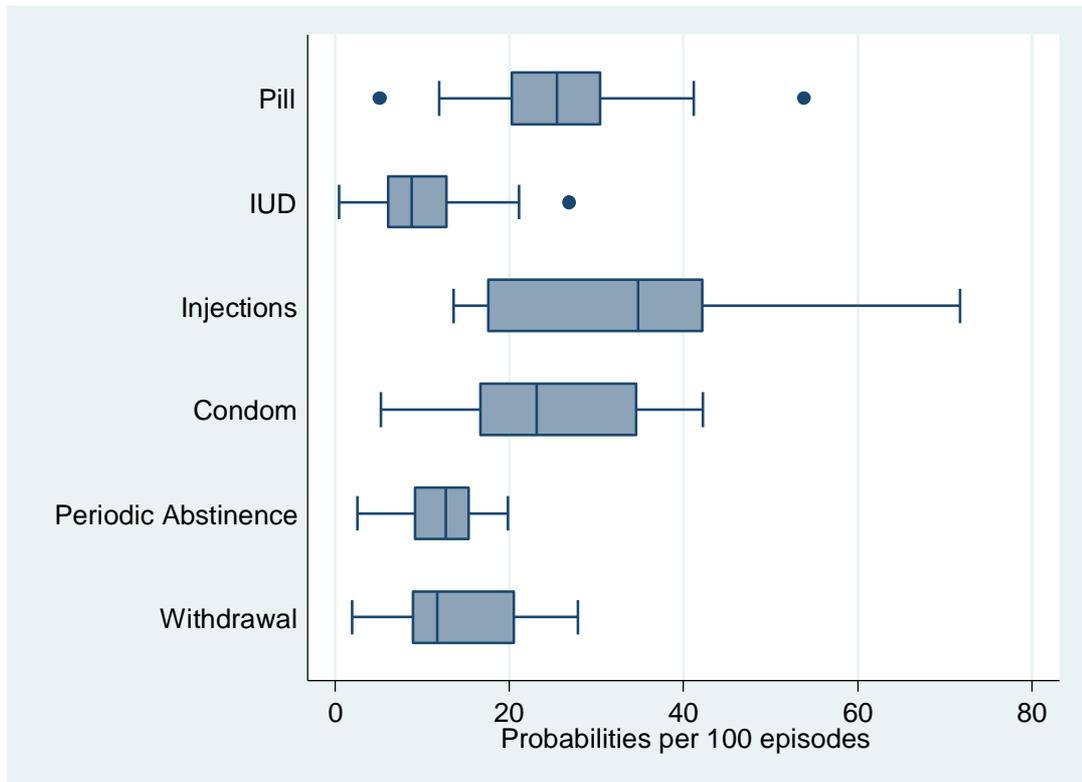


Reproduced from Ali et al. (2012)[89]

Bradley’s investigation into contraceptive switching and discontinuation using DHS data from eight countries, finds that discontinuation in the first year ranges from 18-63% across countries, and that most of these are among women who still need contraception[85]. In line with previous studies[89, 90], they find that the most important predictor of contraceptive discontinuation is method-type. Using data from 60 DHSs, the probability of method-related discontinuation at 12 months by method-type is presented in Figure 3.4 [89]. There is a higher probability of discontinuation for injection users, which is the most commonly used method in Malawi. Bradley and colleagues also find that age, parity,

education, partner's desired fertility, and community-level contraceptive prevalence are factors associated with switching, failure or discontinuation[85].

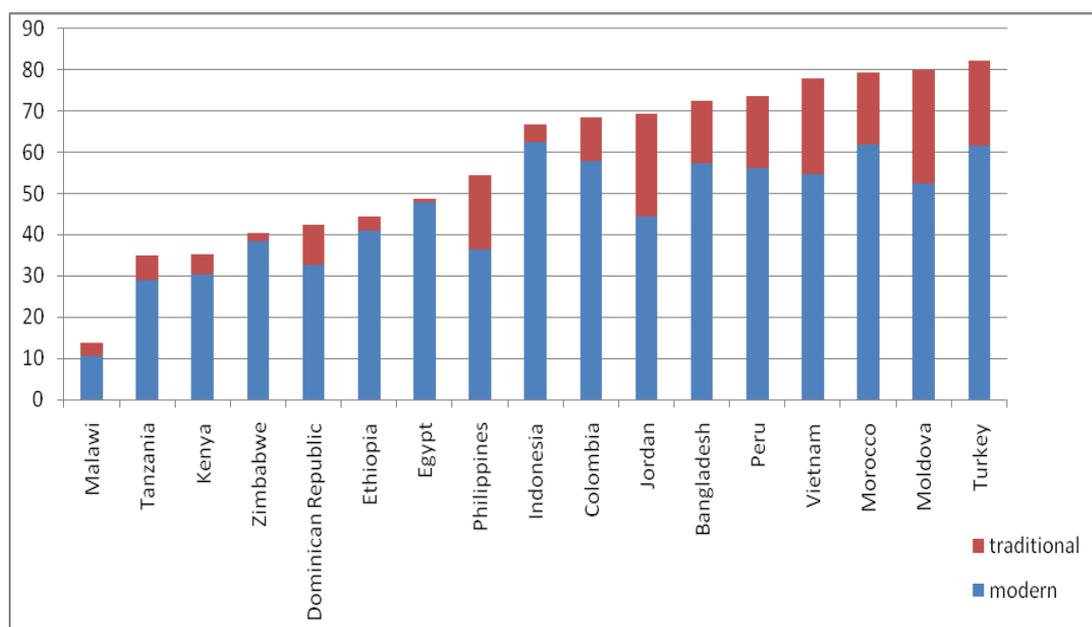
Figure 3.4 Probabilities of method-related discontinuation at 12 months



Reproduced from Ali et al. (2012)[89]

Analysing data from DHS contraceptive calendars of 17 countries, Ali and colleagues looked at method-switching among women who stopped using FP for method-related reasons[89]. They found that sub-Saharan African countries had lower probabilities of switching to another method at three months post-discontinuation (Figure 3.5). Only 14% of Malawian women had switched to another method. This shows that following contraceptive discontinuation, Malawian women are at higher risk of unintended pregnancy compared to women in other countries in the region.

Figure 3.5 Per cent who switched to a modern and to a traditional method within three months of method-related discontinuation



Reproduced from Ali et al. (2012)[89]

3.3.2 Reasons for method/provider choice & switching, and discontinuation

There could be a number of reasons that influence initial method choice. Reasons for switching FP methods may be similar, although they are usually based on more solid experiences and critical understanding, and there may be some additional reasons for discontinuing. Method-related reasons are summarised in Table 3.1.

Reasons for contraceptive discontinuation may be grouped as follows: a) there is no longer need to use FP (e.g. a desire to become pregnant, menopause, change in relationship status e.g. divorced/ widowed/ separated, husband away, not sexually active), b) FP method failure (accidental pregnancy), and c) method-related reasons (rows listed in Table 3.1). Method-related reasons are particularly important to examine, because these affect women who are no longer using, despite having a need for contraception. Khan's 2007 examination of DHS data collected between 2000 and 2005, found that in 11 of the 12 countries included in the analysis of reasons for FP discontinuation, one-third to one-half of women reported a method-related reason for stopping contraception[86].

Although good quality counselling on expected side effects is important to maintain FP use, improvements in service provision are unlikely to encourage women to continue using a method, if they are inherently dissatisfied with that method[94]. Ali and Cleland (2010) suggest that FP service providers should expect a significant number of couples to discontinue their chosen contraceptive method and that these will need to be switched quickly to another method[87]. This is especially important in countries like Malawi where the method-mix is dominated by injectables that are easy to discontinue, and where there are sometimes stock-outs.

Table 3.1 Method-related reasons for switching/discontinuation of FP

Reasons highlighted	Publications and geographic coverage				
	Westaway, 1997[95]	Sambisa, 1996[96]	Baumgartner et al, 2007[97]	Bradley et al, 2009[85]	Dasgupta, 2010[98]
	South Africa	Zimbabwe	South Africa	8 countries, world-wide	4 countries, Africa, Asia
Side-effects / health concerns	Bleeding irregularities commonly cited	Main reason for stopping injectables		Side-effects common reason for discontinuing range 2 - 37% (Armenia - Egypt)	√
Interference with sexual pleasure	Most commonly cited reason for condoms				
Partner disapproval	√	√		√	√
Practicalities: convenience, access, cost, availability and confidentiality	√	√	Re-injection appointments: 30% had conflicting priorities, 15% no money for transport	Cost/access relatively minor reason for stopping	
Effectiveness of method		Condom/pill users report desire for more effective method		Up to 20% switched/ discontinued for this reason (Colombia)	
	Perceived difficulty in getting pregnant following hormonal methods can result in tolerance of a less effective method				
Ambivalence, fatalistic approach to pregnancy				√	
Cultural acceptability	Cultural reasons more relevant for initial choice. Condoms less acceptable in marriage (Africa). Tubal ligation only acceptable after achieving desired parity.				

√ denotes that the article reported this as a general reason for switching/discontinuing

Reasons for selection of FP provider may simply depend on what is available, but there may be other factors that determine a woman's choice of FP source, including distance to provider, cost, perceived confidentiality, quality of service, and waiting time.

3.3.3 Methodologies for collecting contraception data

Data on contraception come from a variety of sources for example; surveys, routine data collected at health facilities, follow-up surveys of family planning acceptors, or using the DHS calendar method. Many family planning programmes convert routine contraception

data into “couple years of protection” (CYPs), which is the estimated protection from pregnancy provided by different methods over one year[99, 100]. This is a useful metric to track progress in the provision of contraceptive services by programmes and countries, and can also estimate the potential population-level impact of family planning[101]. But it does not provide an understanding of contraceptive switching and discontinuation.

Evaluations of the calendar methodology suggest it is fairly robust and reliable[84]. It has been shown that the calendar method can reduce heaping of reports on integer years (which would result in a longer duration of use in the aggregate), compared to standard questionnaires [102, 103]. However, Strickler and colleagues argue that contraceptive discontinuation and failure rates are less likely to be accurate in calendar data. Methods that are delivered at unique specific dates such as sterilisation could be easier to recall than other methods and so the calendar method may be more or less accurate depending on the method-mix in a country. A study from Bangladesh found poor consistency between reports from a baseline interview compared to reports in a follow-up survey where women were asked to report retrospectively on their contraceptive use for the same month as the baseline survey[104]. This was true especially for women with complex reproductive histories. This calls for an exploration of other methodologies for collecting family planning data, which may better capture contraceptive switching or discontinuation.

3.4 A comment on Tumbuka words used to mean “preventing pregnancy”

It has been argued that language and metaphor is a central mechanism of the human mind and thought processes, and allows us to draw on what we know about our existing social or physical experiences in order to make sense of new subjects, particularly abstract issues[105]. Therefore, metaphors can shape human’s understandings, perceptions, and actions. They are not simply linguistic tools, but are deeply rooted and structured in a cultural background. Furthermore, different cultures can have very different worldviews

about the life-course, reproduction, and preventing pregnancy[106]. With this in mind, this sub-section explores English and Tumbuka words relating to preventing pregnancy, considers how language is structured by culture, and argues that if the language of contraception relates to different worldviews then it is necessary to reflect on this if and when promoting family planning programmes in Tumbuka.

“Birth control”, “family planning”, “contraception” are all English terms used to describe a method or device to prevent a pregnancy. These terms inevitably carry implicit allusions, meanings or imagery. “Family planning” conjures up images of children and a consideration of family life, which for some women and men, may be far removed from their current motivations to have safe, pregnancy-free and enjoyable sex.

Even the word “birth” in “birth control” is perhaps close to the idea of children. And “control” conjures up connotations of restriction, constraint and rules, and also has associations with population control.

From the Latin *contra* (against) and *conceptio* (conceive), “contraception” literally means “against conception”, which does perhaps more accurately describe the many methods used by women and men who don’t intend to have a pregnancy, but again, conjures up negative undertones by use of the word *contra*, particularly as it almost entices a rebuttal from the Catholic church.

But what are the equivalent words, phrases and meanings used in Tumbuka, in northern Malawi? In general, vocabulary in Tumbuka is small compared to English, so in many cases words are used in multiple ways and the context or the voice tells the listener what it means. English words are frequently recognisable in “newer” Tumbuka words (e.g. tabulu – table, pensulu – pencil, sukulu – school), and pure English words can be used if there is no Tumbuka word for it.

Kulera is a Tumbuka and Chichewa verb used to mean “to prevent pregnancy”, literally meaning “to look after” or “to take care of”, and it includes all modern methods. Despite being commonly used in Malawi, traditional methods (e.g. withdrawal or calendar method) are not included in the term *kulera*, and some would not even consider condoms to

be a method of *kulera*. The Tumbuka phrase *Kuthaska nthumbo* is a more general term for preventing a pregnancy, and can include all methods: traditional methods, condoms, as well as modern methods.

Sindano – the injectable – is the most commonly used modern method to prevent pregnancy, in Malawi. It literally means a “needle”, and so *sindano* can be used to refer to other medicines as well, including child vaccinations. It’s the context in which the word is used that helps people to understand whether they are referring to the contraceptive injectable, which in Malawi is usually Depo provera (DMPA). Similarly, because *nthowa* means “road” or “pathway” and *pakawoko* means “arm”, *Nthowa ya pakawoko* refers to the method that is put on the arm, or rather the implant. If someone were to say *nthowa zaka 5*, they are referring to the method that is for 5 years, which implicitly means Norplant or more recently Jadelle, which are the commonly provided implants in Malawi. *Mapilisi* refers to oral contraceptive pills (from the English word “pill”), and if someone says *mkumwa mapilis* it means the person is “drinking contraceptive pills” and doesn’t mean any other type of pills. This is similar to the English name “The pill”. We understand it is the contraceptive pill because of the context in which the word is used, and perhaps also because the article “The” is always used. Female sterilization or tubal ligation is known as *kujara* in Tumbuka, which translates as “closing”. As *nthowa* means “road”, if someone were to say *kujara nthowa*, they mean closing the pathway and not giving birth any more. For the intra-uterine contraceptive device, Tumbuka has borrowed the English word *loop*, and an alternative is *mbeza* which is a word used when fishing using a hook. The names of these different methods are mainly descriptive of how each method is used.

For the traditional methods, *mazuwa* means “days” and can apply to days of the menstrual cycle, or days in a month. If someone *kuwerenga mazuwa*, they are counting the days, i.e. using the calendar method. There are a number of different ways to refer to the withdrawal method, including *kuduka* (“jumping”), *kuthira pansi* (“pouring out”), or *kuwa waka* (“falling down”).

Other traditional beliefs to prevent pregnancy include *kukhama* (literally, “squeezing out” or “milking”), which involves breathing in very strongly after sex in order to rid the body of sperm, or *vyoto*, where the woman drinks ashes in water to prevent a pregnancy.

Two socially marketed condoms in Malawi are *Chishango* (Population Services International), which translates as “shield”, referring to a protector item, and *Manyuchi* (Banja La Mtsogolo, BLM), which translates as “honey”. Although chocolate flavoured and studded, *Manyuchi* condoms were given their name probably because “honey” represents the sweetness of sex or an endearment. Some of the reasons given for non-use of condoms is that “one cannot eat sweets with the cover on”[81], the sperm is thought to nourish the woman, and ideal sex is to be “skin on skin”[80] (*nyama ku nyama oro*=meat to meat contact, or *sumbi ku sumbi*=egg to egg). Therefore, associating the condom with something sweet was probably a clever marketing strategy to encourage people to use the product.

Other words for a condom are *moyo* meaning “life” (either the condom is to preserve life, or *moyo* refers to the “life-force” of the sperm, so a condom catches that life-force[107]), *jumbo* meaning “plastic shopping bag” or “gum-boot”, and *mdidi*, which has been described as if someone is producing a heavy sound like an earthquake, or the sound someone makes when they are running with a thud or thump. It’s a heavy and important thing, like protecting yourself against pregnancy or STIs.

Banja La Mtsogolo, is a local provider of methods to prevent pregnancy and is a partner of Marie Stopes International. The *Banja La Mtsogolo* clinics have become a household name and the name literally translates as “future families” in Chichewa, although the name implies that it is the place to go if you do *not* want to have a child. The name is particularly associated with female sterilisation and post-abortion care services, to the extent that some people are not aware that BLM provides other sexual and reproductive and general health services.

Some translations of other Tumbuka words associated with fertility really demonstrate the high fertility pressures and societal norms, for example *kuzenga mudzi* refers to increasing offspring, but the direct translation means “building a territory”. *Kunya*

waka waka refers to giving birth to more children, but again the direct translation means “manufacturing children”. However, the societal disapproval of poor birth spacing is reflected by a number of negative terms referring to a situation where a woman becomes pregnant while the previous child is still very young: *kutinya* and *nthumba ya chiwulira*.

In Tumbuka, many of the euphemistic words for methods of contraception are similar to those used in English, whereas others are more descriptive of the appearance of the methods themselves and have different connotations. The wide range of Tumbuka words associated with different aspects of preventing pregnancy make it clear that if there is a shift in language to give a more attractive message surrounding ‘family planning’, (for example to ‘safe sex’, ‘free sex’, or ‘preventing pregnancy’ in English), then care will need to be taken to ensure that the words used in local languages also reflect those implications. If there is to be a discourse on how to positively spin family planning descriptors to be more attractive to different groups, there needs to be an understanding that the dialogue in local languages may need to have a different emphasis.

Section II. Results

4 Results A: The Impact of Fertility Intentions and Contraception on Conceptions

4.1 Introduction

In this chapter, I set the scene and explore the magnitude of the problem that the rest of this thesis addresses. I question why fertility remains high in Malawi despite seemingly high contraceptive use. I use existing longitudinal data from the Karonga Prevention Study, to assess the impact of women's reported prospective fertility intentions and contraception on conceptions. I also examine the stability of intentions and contraceptive reports between interviews as they are inherently changeable. I measure the extent of variation, and comment on the utility of reported fertility intentions and contraceptive measures. This is a secondary data analysis and I was not involved with the field-work undertaken for collecting the data discussed in this chapter.

4.2 Background

It is important to understand the relationship between reported fertility intentions, intermediate outcomes such as contraceptive use, and final outcomes of conceptions and births, as it helps to know whether women are managing their fertility and achieving their expressed fertility desires. It also helps to shed light on the level and trend of unintended pregnancies, which are an important measure for assessing the success of contraceptive programmes[108]. Provision of contraceptive services enables women to choose both when and whether to have children in relation to their fertility desires. Programme strategies could

be modified for specific target groups, particularly if the relationship between fertility intentions and fertility differs by socio-economic and demographic subgroups[109].

Survey questions about *fertility intentions* are used to quantify and measure *intendedness* of children. Having intentions and desires is likely to be a step towards rational choices about family planning, and being able to articulate this to an interviewer suggests the notion of *fertility intentions* could have some validity. Any intervention aimed at increasing contraceptive use should primarily target those who already know that they do not want to become pregnant, so it is important to understand what prevents such women from acting upon their expressed desires.

The London Measure of Unplanned Pregnancy has been shown to be a valid and reliable approach to measuring unplanned pregnancy among women whose pregnancies have already occurred[110]. It is a six-item measure of unplanned pregnancy where women report retrospectively on their circumstances and feelings at the time of pregnancy.

Some have criticized the notion of *fertility intentions* in the sub-Saharan African context[111-113], arguing that African women have a much more fatalistic attitude toward childbearing. Stated intentions from a structured survey might not have a deeper meaning other than the responder simply trying to appease the interviewer. *Intending* to become pregnant could be different from *wanting* to be pregnant, and the idea of planning a pregnancy is likely to mean different things to different women[108, 114-116], and so intentions may not necessarily be wholly predictive of subsequent behaviour. Furthermore, a desire for children might be more associated with social pressures than with personal preference. However, in this context, any expression of wanting no more children might be seen as all the more powerful, given high fertility norms and fatalism.

Reported fertility desires are dynamic and change[117-122]. There is evidence from a number of parts of the world of *ex post rationalisation*, i.e. the propensity to retrospectively report children as wanted when the conception was unwanted at the time[123-125]. This finding undermines the validity of using retrospective reported fertility intentions to measure intendedness at the time of conception. But fertility desires may be

inherently unstable and dependant on changing circumstances, and some women do not always have explicit plans for reproduction, as evidenced when their attitudes and behaviours are not consistent[126].

Few studies have gathered information on fertility intention before the birth of a child, in a longitudinal format looking at fertility outcomes. There have been several studies describing prospective fertility intentions, including comparing the intentions of HIV positive and negative women [76, 127-130] (as knowledge of HIV status is likely to have an impact on the desire for children[77, 127, 131, 132] and HIV is thought to affect fertility through a number of different mechanisms[133-136]). Yet there is little research on fertility as an outcome. Exceptions include a prospective analysis of US data[137], and an examination of the interrelationship between future fertility intention and subsequent fertility behaviour in rural Bangladesh using longitudinal data[138]. The Bangladesh study found that fertility intention is an important predictor of subsequent fertility behaviour. Women wanting no more children were one third as likely to have a child during a 5-year follow up than those wanting more children, even when background variables are controlled for. A recent paper by Speizer using longitudinal data from Uttar Pradesh in India, confirms that women who report wanting no more children and use contraception were least likely to experience a pregnancy or birth in two years of follow up[139]. Women who want no more children but who do not use contraception were also less likely to experience a pregnancy or birth, suggesting intentions have an important independent impact. However, there was no difference in pregnancy/birth risk for women who want to delay childbearing as compared to women who want a child soon.

Turning to our study area in northern Malawi, in a fertility intentions study nested within the KPS demographic surveillance site (DSS), Baschieri and colleagues [36] found that decision making processes in monogamous and polygamous unions are different. The translation of fertility preferences into contraceptive use is less strong in polygamous couples, even though those in polygamous unions were more likely to express a desire to stop childbearing than those in monogamous couples. Dube and colleagues [76] used the

same set of data and explored the relationship between fertility intentions and contraceptive use for monogamous couples in the context of HIV. They found that knowledge of HIV status is associated with an increase in the reported desire to cease childbearing, but there was limited evidence that this desire led to higher use of contraception. HIV positive men and women were twice as likely to report a desire to stop child bearing compared to those who were HIV negative. After controlling for HIV status and other background characteristics, couples where both partners wanted to stop childbearing were more likely to use contraception.

In this chapter, I use longitudinal data from the same study on prospective fertility intentions in northern Malawi, with longer follow-up beyond examining contraceptive use as an outcome. I assess the stability of fertility intentions reports in order to comment on the validity of the measure. I then examine the impact of fertility intentions on conceptions that resulted in full-term births. This is a new contribution to the research in the area, because of: the ability to track changes in prospective fertility intentions over time; the possibility to link to a large DSS with high quality data on births allowing exploration of conceptions as an outcome; and the availability of a number of potentially related variables.

4.3 Methods

4.3.1 Study setting and data

The Karonga Prevention Study (KPS) operates a demographic surveillance site (DSS) in northern rural Malawi on the coast of Lake Malawi, where the population (with 36,524 individuals in 8,076 households at the end of 2012[45]) has been under continuous surveillance since 2002. Key informants – who are village residents – report births and deaths to KPS in a monthly reporting session, and an annual re-census verifies these data and collects data on migrations[45, 46].

The main economic activities in the area are farming, fishing and small businesses. The population is predominantly Christian, and Tumbuka speaking. The median age of first marriage is 18, and the onset of childbearing is early, with 90% of all 20-24 year old women having at least one child[36]. Society is patrilineal[48], and 15% of men and 27% of women were in a polygamous marriage in 2009[49], although the life-time experience of polygamy is higher. From HIV sero-surveys, HIV prevalence in the area is estimated at 7% in adult males and 9% in adult females[47].

Three rounds of annual population-based adult sexual behaviour surveys amongst women aged 15-59 started in August 2008 (taking one year for each round to complete the survey area) finishing in August 2011. The interviews took place approximately one month after the annual re-census of the DSS area, which included collection of demographic and socio-economic data such as educational attainment, so the sexual behaviour data could be linked to the census data. For the sexual behaviour survey, women were asked questions in the local language on a number of topics including marital status, current use of contraception (“Are you currently using any method to avoid getting pregnant? If yes, which main method are you currently using?”), and prospective fertility intentions (e.g. “Do you want to have any (more) children any time in the future? If yes, How long would you like to wait before having another child?”).

4.3.2 Analytical approach

The relationship between fertility intentions and subsequent conceptions was examined, and the role of other variables (contraception, education, marital status, distance from road and parity) in mediating this relationship was explored. Figure 4.1a presents an overall conceptual framework outlining selected pathways of influence through intermediate variables collected in the sexual behaviour survey and the DSS, which justifies the statistical analysis approach adopted in this chapter. Figures 4.1b, c, & d are subsets of Figure 4.1a. They present some examples of the influences operating along each of the direct paths for

determinants of fertility intentions, contraception, and conceptions: the influences described are conjectures about the likely mechanisms that may operate, not necessarily variables that were measured in the population surveys. For example, Figure 4.1b shows that age, education, parity and marital status may be determinants of the desire for children. Women with higher levels of education are likely to want fewer children because they may have other ambitions. Residence, marital status, education and desire for children are likely to be determinants of contraceptive use (Figure 4.1c). And finally, age, marital status, contraceptive use and desire for children, are likely to be determinants of conceptions (Figure 4.1d).

Figure 4.1 a) Selected pathways of influence used in statistical analysis, determining desire for children, contraceptive use, and conception

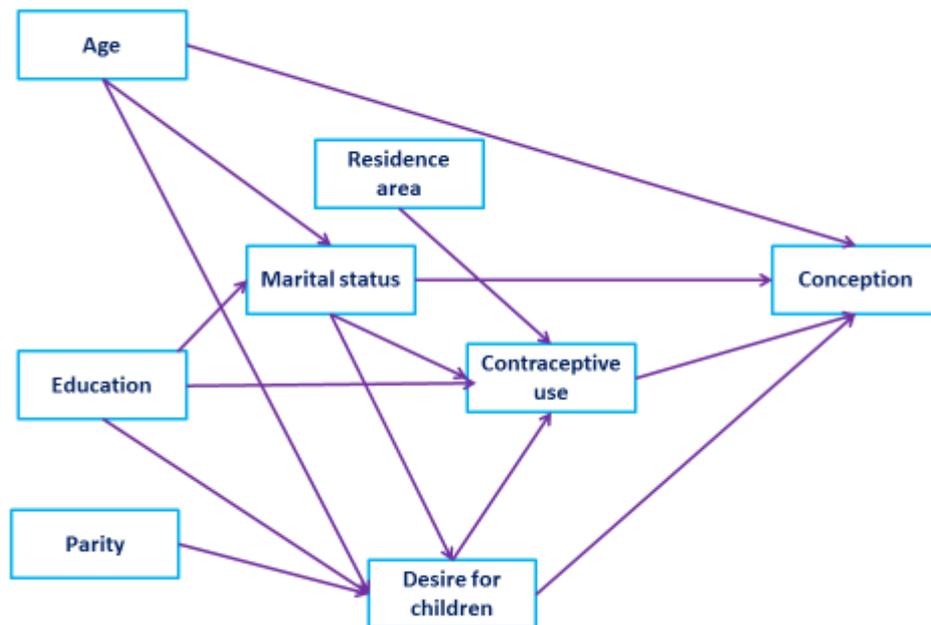


Figure 4.1 b) Determinants (with examples of likely mechanisms) of desire for children

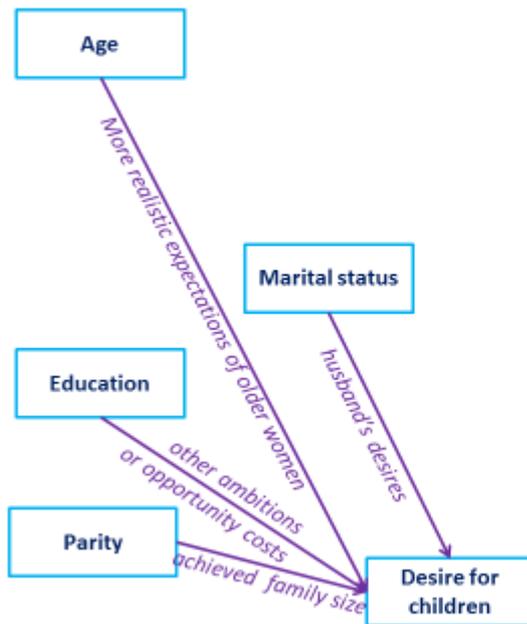


Figure 4.1 c) Determinants (with examples of likely mechanisms) of contraception use

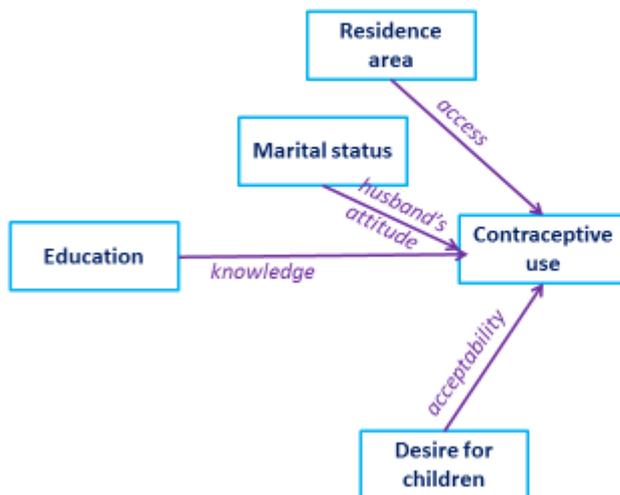
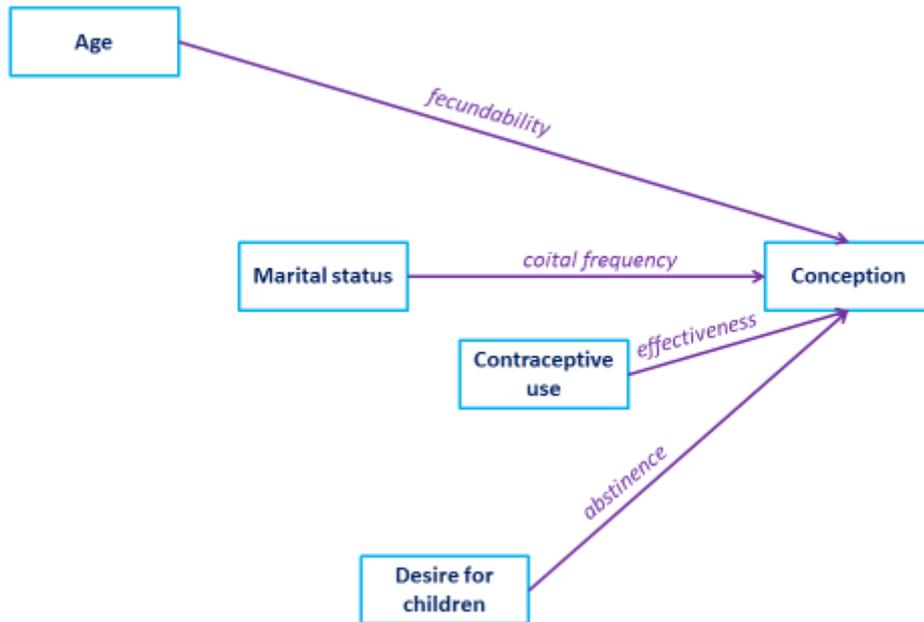


Figure 4.1 d) Determinants (with examples of likely mechanisms) of conceptions



All women aged 15-49 who were resident in the DSS area and participated in at least one adult sexual behaviour survey interview were included in this analysis and contributed person-years exposure to “risk of” conception. The outcome of interest was conceptions that were carried to term, assumed to occur 270 days prior to an observed birth. Conceptions rather than births were considered to be the outcome event because this is the time point at which it becomes known whether the woman has been able to put into practice her fertility preferences. It is also the point from which we could expect a woman to start *post factum* rationalisation of her desire for a child, and it is the theoretical point from which women were supposed to be excluded from questions about fertility preferences (due to pregnancy). The Karonga Prevention Study records live and still births to a high degree of completeness[46]. Key Informants are well trained to report stillbirths to KPS. The stillbirth rate for Malawi is estimated at 24/1,000 live births, which is in line with the KPS estimate of 26/1,000 live births[140, 141]. Therefore both live and stillbirths were included when estimating conception dates. Nevertheless, conceptions resulting in early spontaneous or induced abortions would have been missed (the Malawi abortion ratio is estimated at 12 per

100 live births [42-44]), as it was not possible to collect accurate data on these events, compounded by social taboos and legal restriction of abortions in Malawi.

Stata 12 was used to analyse the data. Event history analysis was used to calculate conception rates, using previously stated fertility intention as an explanatory variable. The woman-years of observation records were split into conception episodes for each woman, where episodes ended in a conception or the end of a household residency episode (migration) and were right-censored at the time of the last observation of the woman in the DSS. The episodes were also split on five-year age groups (from 15-49), and to reflect changes in marital status, fertility intentions and contraceptive use. The average number of days between the survey interviews (regardless of whether rounds 1 & 2, 2 & 3, or 1 & 3) was 393 days (s.d.90). Therefore the mid-point falls on average at 196 days, the average time at which time-varying covariates are assumed to change (if the next observation was different from the previous one). 94% of the interviews took place within 18 months of each other. Women who were identified as pregnant at the time of interview based on the date at which they subsequently gave birth were excluded from the analysis, as pregnant women were ineligible to answer the fertility intentions questions. Analysis allowed for multiple failures in individual records (i.e. one woman might contribute more than one conception), and staggered recruitment times.

Descriptive findings of the study participants are presented, and the relationship between marital status, fertility intentions and contraception is described. The stability of time-varying covariates between interviews is evaluated. Age specific conception rates and cumulated (Nelson-Aalen) conceptions to age 50 were estimated, using non-parametric hazard analysis. The Nelson-Aalen cumulant is a synthetic cohort measure equivalent to the total fertility rate. The probability of having a conception at 1 and 2 years since interview is also presented, by previously stated fertility intention and contraceptive use. Multivariate analysis was carried out using piece-wise exponential regression, to look at the relationship between fertility intentions and conceptions, and the role of other variables.

4.3.3 Variables

The age of women, and all births are obtained from the continuously updated DSS database. Residence episodes for all women living in the DSS provide the person years of exposure to risk of conception, and these residence episodes also provide the GPS coordinates of the household, from which it can be established whether the woman lives within 1km of a road. It is assumed that education categories do not change for a woman in childbearing ages, as it is unlikely that women resume education after bearing their first child [142]. The highest education level reported across the surveys is used, split into three categories: none/primary level 1-5, primary level 6-8, and secondary level and above.

Time-varying covariates such as fertility intentions, contraception and marital status, are considered unknown prior to the first report, and are assumed to remain constant for six months after the final report. In the event that the report status changed between interviews, the change is assumed to occur at the mid-point between interviews. As this was a yearly survey, for most women this point was roughly six months after the reporting date. Marital status is categorised as currently married (both monogamous and polygamous), separated, widowed, and never married.

The categories of prospective fertility intention created are: wants a(nother) child within two years, wants to wait 2 or more years before having a(nother) child, wants a(nother) child but unsure when, wants no more children, or unsure. In some analyses, a fertility intention variable that removes the timing aspect is used: wants a(nother) child, doesn't ever want a(nother) child, unsure.

Contraception is likely to be an important factor on the path between fertility intentions and conceptions. Three contraception variables were created broken down into: a) method (none, traditional method (e.g. withdrawal, calendar, folk methods), condoms, oral contraceptive pills (OCP), 3-monthly injectables, implant/intra-uterine device (IUD), female sterilisation); b) broad categories: not using a modern method, using condoms, using a short-term method (OCP or injections), or using a long-acting/permanent method (implant, IUD,

or tubal ligation), and; c) summarised as a binary variable for whether the woman is using modern contraception (yes/no) (Table 4.1).

Table 4.1 Classification of methods of contraception use

Classification (a)	Classification (b)	Classification (c)
Method		
None	Not using modern	Not using modern
Traditional		
Condoms	Condoms	Modern method
Oral contraception	Short-term	
Injectables		
Implant / intra-uterine device	Long-term	
Sterilisation		

4.4 Findings

4.4.1 Descriptive findings

There were 7,228 non-pregnant women aged 15-49 who participated in the adult sexual behaviour survey at least once (Table 4.2). Women contributed an average of 2.1 interviews (range 1-4). Only 36.1% of women were interviewed in all three rounds. The low figure (just over one in three) is due to migration, which is high among women under 25, who tend to move households when they get married, in line with the patrilocal traditions of the community. Some women who moved house were captured more than once in a single round and so eighteen contributed four interviews. Of eligible women who were seen, 95.4% agreed to be interviewed.

Table 4.2 Number of interviews contributed by women

Number of interviews	Women % (N)
1	31.9
2	31.8
3	36.1
4	0.3
Total	100 (7,228)

Descriptive findings are presented in Table 4.3. For time-varying covariates, descriptive findings are presented for each of the three rounds. In the situation of a woman who contributed to a particular round more than once, the first observation is used. For education, the maximum educational level attained is reported. As 64.2% report using no contraception, and 2.1% use traditional methods, then 33.7% of all non-pregnant women use a modern method of contraception in round 1. This figure is comparable to the 32.6% figure amongst all women according to the Malawi DHS. The proportion of married women who report currently using a modern method of contraception is 42.0% (not shown in table), which is comparable to the Karonga DHS figure of 45.4%. 44.3% of women reported wanting no more children in round 1, and the overall proportion of women wanting no more children is relatively stable between the rounds.

Table 4.3 Descriptive findings: Profile of study participants (N)

Variable	Round 1 (N=4,190)	Round 2 (N=5,469)	Round 3 (N=4,517)
Age (mean)	27.7 (s.d. 10.9)		
Education level (maximum attained)			
None/primary 1-5	14.8		
Primary 6-8	56.0		
Secondary +	29.1		
Total	100 (4,185)		
Area of residence – proximity to road			
<1km	47.8		
>1km	52.2		
Total	100 (4,190)		
Marital Status			
Currently married	69.3	67.4	68.8
Separated	9.1	10.5	10.3
Widowed	4.4	4.2	3.8
Never married	17.2	17.9	17.1
Total	100 (4,190)	100 (5,469)	100 (4,517)
Parity			
0	1.1	1.2	1.0
1-4	61.7	62.5	63.3
5+	37.3	36.3	35.7
Total	100 (3,392)	100 (4,458)	100 (3,694)
Family planning use - method			
None	64.2	61.7	54.1
Traditional	2.1	2.0	2.3
Condoms	11.6	9.4	9.6
OCP	1.8	1.8	1.5
Injection	11.8	14.5	19.5
Implant/IUD	1.4	2.0	2.8
Sterilisation	7.1	8.7	10.2
Total	100 (3,991)	100 (5,283)	100 (4,261)
Fertility intention			
No more	44.3	44.2	40.3
Wait 2+ yrs	30.0	34.9	35.7
Want within 2 yrs	13.1	11.8	12.0
Want, unsure when	7.5	7.2	7.5
Unsure	5.2	1.9	4.4
Total	100 (3,924)	100 (5,253)	100 (4,401)

4.4.2 Determinants of fertility intentions

Figure 4.1b presented a framework of the determinants of fertility intentions, including age, marital status, parity, and education. The relationship between these factors and “fertility intentions” is presented in Table 4.4 for women who participated in the first round of the survey, in order to get an understanding of the baseline association. Younger women are more likely to want more children (87.3% of the under 20s would like more

children) than are older women (6.8% of women over 40 want more children). Currently married and never married women are more likely to report wanting more children (49.3% and 80.8% respectively), than are separated or widowed women (32.6% and 8.7% respectively).

Table 4.4 Relationship between age, marital status, parity, education, and: fertility intentions

	Prospective fertility intentions			Total % (N)
	No more %	Want more %	Unsure %	
Age*				
Under 20	7.9	87.3	4.9	100 (763)
20-29	24.9	70.4	4.8	100 (1,411)
30-39	67.8	25.7	6.5	100 (1,085)
40+	89.0	6.8	4.2	100 (665)
Total	44.3	50.5	5.2	100 (3,924)
Marital status*				
Currently married	46.3	49.3	4.4	100 (2,807)
Separated	58.8	32.6	8.6	100 (371)
Widowed	85.6	8.7	5.8	100 (173)
Never married	12.7	80.8	6.5	100 (573)
Total	44.3	50.5	5.2	100 (3,924)
Parity*				
0	20.0	76.0	4.0	100 (25)
1-4	33.1	62.1	4.8	100 (2,052)
5+	80.8	13.7	5.5	100 (1,240)
Total	50.8	44.1	5.0	100 (3,317)
Education*				
None/primary 1-5	57.4	35.3	7.4	100 (570)
Primary 6-8	48.9	46.1	5.0	100 (2,202)
Secondary +	29.0	66.7	4.4	100 (1,147)
Total	44.3	50.6	5.2	100 (3,919)

* χ^2 test significant at $p < 0.001$

4.4.3 Determinants of contraception use

Figure 4.1c presented a framework of the determinants of contraception use, including fertility intentions, marital status, residence, and education. The relationship between these factors and family planning is presented in Table 4.5 for women who participated in the first round of the survey, in order to get an understanding of the baseline association. Women who reported they want no more children are more likely to use long-acting methods of contraception (17.8%) than women who want more children (1.2%),

although there is not a marked difference in non-use of contraception between those who do (68.0%) and do not (61.3%) want more children. Marital status and education were found to be associated with use of modern contraception. Proximity to a road did not appear to be a predictor of family planning use.

Table 4.5 Relationship between fertility intentions, marital status, residence, education, and: use of family planning

	Use of modern family planning				Total % (N)
	Not using %	Using condoms %	Using OCP/injectables %	Using long-acting FP	
Fertility intentions*					
No more	61.3	9.1	11.8	17.8	100 (1,720)
Want more	68.0	14.7	16.1	1.2	100 (1,966)
Unsure	79.8	6.6	10.1	3.5	100 (198)
Total	65.7	11.8	13.9	8.7	100 (3,884)
Marital status*					
Currently married	58.0	13.8	17.4	10.8	100 (2,823)
Separated	76.3	7.3	10.0	6.5	100 (371)
Widowed	85.8	6.5	3.0	4.7	100 (169)
Never married	92.7	5.3	1.6	0.5	100 (628)
Total	66.4	11.6	13.6	8.5	100 (3,991)
Proximity to road					
<1km	65.8	11.2	13.3	9.7	100 (1,919)
>1km	66.9	11.9	13.9	7.4	100 (2,072)
Total	66.4	11.6	13.6	8.5	100 (3,991)
Education*					
None/primary 1-5	69.2	9.8	10.2	10.8	100 (581)
Primary 6-8	65.1	11.3	13.8	9.8	100 (2,226)
Secondary +	67.3	13.0	14.8	5.0	100 (1,179)
Total	66.4	11.6	13.6	8.5	100 (3,986)

* χ^2 test significant at $p < 0.001$

Ordered logistic regression was conducted to explore the probability of using contraception by fertility intention. Ordered logistic regression assumes there is a sequence to the categories, but does not assume that the step from one category to the next is fixed. The probability of using a contraceptive method by fertility intention is presented in Table 4.6. Women who reported wanting no more children were more likely to use condoms, short-term methods, and long-acting/permanent methods, than women who reported wanting more children. The 95% confidence intervals do not overlap, suggesting the different probabilities are statistically significant.

Table 4.6 Probability of using contraception by fertility intention, using ordered logistic regression, (with 95% confidence intervals)

Fertility intention	Contraceptive method				Total
	Nothing	Condoms	OCP/ injections	Implant / IUD / tubal ligation	
Want more children	0.70 (0.65-0.75)	0.11 (0.10-0.12)	0.12 (0.10-0.14)	0.07 (0.06-0.09)	1.00
Don't want any more children	0.58 (0.56-0.61)	0.13 (0.13-0.14)	0.17 (0.16-0.18)	0.11 (0.10-0.13)	1.00

4.4.4 Stability of time-varying covariates between interviews: marital status, fertility intentions, and family planning

The stability of responses on marital status, fertility intentions, and family planning between one interview and the next was explored. These transitions are for all rounds (1-2, 2-3, and 1-3). The values appearing diagonally in the following three tables are those in which the reported status did not change between interviews. Table 4.7 shows that 96.7% of women who reported they were married in one round also reported they were married in the next interview. There are only a small number of logically impossible transitions, which speaks to the good quality of the data. Note also the rapid transition back into marriage of women who are separated. Marital status reports are highly stable between interviews, at 92.1% overall (Table 4.10).

Table 4.7 Comparison of marital status in one survey, to marital status in the next survey

	Marital status – next survey				Total % (N)
	Currently married	Separated	Widowed	Never married	
Marital status					
Currently married %	96.7	2.6	0.5	0.2	100 (6,783)
Separated %	18.6	72.1	6.4	2.9	100 (716)
Widowed %	6.7	12.2	80.1	0.9	100 (327)
Never married %	15.4	4.1	0.0	80.5	100 (1,114)

no change in marital status
common, expected change – usual transition
unusual unexpected change – two transitions
illogical change - misreporting

Fertility intentions were split according to whether the woman had given birth in the intervening period between two interviews (Table 4.8). Using the simple version of fertility intentions that does not incorporate timing of when the child is wanted, 78.8% of women expressed the same intention in consecutive rounds (Table 4.10). When the time-referenced fertility intention response is used, stability decreases to 67.5%, suggesting it is the time dimension of when to have the next child that is causing instabilities in fertility intention reports. Older women report more stable fertility intentions responses between rounds: 89.1% among women age 40-49, compared to 56.3% among women age 15-19.

Table 4.8 Comparison of fertility intention response in one survey, to the fertility intention response in the next survey by fertility in the intervening period

Fertility in intervening period and prospective fertility intentions	Prospective fertility intentions – next survey			Total % (N)
	No more	Want more	Unsure	
Women who had a child in the intervening period				
No more %	69.8	28.3	2.0	100 (106)
Want more %	25.1	69.6	5.4	100 (355)
Unsure %	50.0	50.0	0	100 (18)
Women who did not have a child in the intervening period				
No more %	81.9	15.7	2.4	100 (2,940)
Want more %	14.3	83.0	2.8	100 (2,493)
Unsure %	43.0	49.7	7.3	100 (193)

no change in fertility intention
common, expected change – achieved intention, stopped wavering
unusual unexpected change – intention change without achievement
unexplained change

Women reported the same contraceptive status (not using; using condoms; using a short-term method; or using a long-term method) between interviews on 66.7% of occasions (Table 4.10). Note that there could also be gaps of use or non-use of contraception between interviews (or switching of methods), which might not have been observed. Therefore 66.7% should be considered the very upper estimate of stability of contraception reports

between rounds, and should not be interpreted as an indication of adherence to contraception. Changes in contraceptive status could be a result of change in sexual activity, separation from spouse, or having had a child. A notable proportion of women who were using condoms (41.3%) or short-term method (29.0%) had stopped by the next interview, which shows that there is high discontinuation (Table 4.9). Women younger than 20 and over 40 have more stable contraceptive status, presumably because some of the former group are not yet sexually active and not using contraception, and the older group are more likely to be using permanent methods.

Table 4.9 Comparison of family planning response in one survey, to the family planning response in the next survey

Family planning use – next survey					
	Not using %	Using condoms %	Using short-term %	Using long-acting %	Total % (N)
Family planning use					
Not using %	72.7	7.5	13.1	6.7	100 (3,791)
Using condoms %	41.3	28.6	25.1	5.0	100 (622)
Using short-term%	29.0	5.6	60.4	5.0	100 (944)
Using long-acting%	18.8	1.8	2.9	76.5	100 (733)

no change in family planning report

Table 4.10 Stability of time-varying covariates between interviews

		Number	Per cent
Fertility intentions (with time dimension)	Not stable	1,976	32.4
	Stable	4,129	67.6
	Total	6,105	100
Fertility intentions (without time dimension)	Not stable	1,293	21.2
	Stable	4,812	78.8
	Total	6,105	100
Marital status	Not stable	668	7.5
	Stable	8,237	92.1
	Illogical transition	35	0.4
	Total	8,940	100
Contraceptive use	Not stable	2,027	33.3
	Stable	4,063	66.7
	Total	6,090	100

Fertility intentions and contraceptive status are just as likely to be stable between two interviews, regardless of the length of time between the interviews (a χ^2 test revealed no significant difference – results not shown).

Presumably as family situations change, so too will fertility intentions. Table 4.11 presents the proportion of women whose fertility intentions and contraceptive use remains stable between rounds, by family circumstances. Unsurprisingly, the birth of a child reduces the stability of a woman's intentions and contraceptive use between rounds. But generally there is relatively little variation in the stability of fertility intentions and contraceptive use, by different family circumstances. This suggests they are inherently changeable regardless of background family situations. Furthermore, fertility intentions appear to be more stable than contraception reports. Considering the pathways of influence as outlined at the beginning of this chapter, these findings demonstrate that fertility intentions and contraception use change when there is a birth or change in marital status, but there is also additional unexplained change on top of these events.

Table 4.11 Stability of fertility intentions and contraception between rounds by family circumstances

Marital status	Birth	% women who have stable fertility intentions	% women who have stable contraception reports
Stays the same	Birth occurs	66.8	54.4
Stays the same	No birth	80.1	67.5
Stays the same	Ignore birth events	79.1	66.5
Changes	Birth occurs	68.1	68.1
Changes	No birth	76.4	68.4
Changes	Ignore birth events	75.1	68.3
Ignore marital status	Birth occurs	67.0	56.5
Ignore marital status	No birth	79.8	67.6
Ignore marital status	Ignore birth events	78.8	66.7

Fertility intentions are now included to examine the stability of contraception reports by changes in: marital status, a birth, and fertility intentions (Table 4.12). Again, the stability of contraception reports decreases when there is the birth of a child. However, contraceptive

use appears to be more consistent after the birth of a child when there are changes in both marital status and fertility intentions, although this was a small sample of women.

Table 4.12 Stability of contraception between rounds by fertility intentions and family circumstances (marital status and the birth of a child)

Marital status	Birth	Fertility intentions	Number of women	% women who have stable contraception reports
Stays the same	No birth	Stays the same	4,043	67.9
		Changes	1,009	64.8
	Birth occurs	Stays the same	267	54.3
		Changes	133	52.6
Changes	No birth	Stays the same	268	67.2
		Changes	86	68.6
	Birth occurs	Stays the same	46	63.0
		Changes	22	72.7

4.4.5 Rates of conceptions

A conception cumulant is a new concept, developed for this chapter. Conception cumulants are a similar measure to total fertility. They indicate the total number of conceptions that would be expected if the woman were exposed to each background factor up to age 50. The cumulated number of conceptions that would be expected by age 50 is 5.0 (95% confidence interval 4.8 to 5.2) per woman. The variation in rates of conception by fertility intentions and other factors is now examined (Table 4.13). For time-varying covariates, one woman could contribute to more than one category of the same variable at different points in time. The number of births and person-years at risk are presented for each category, and the rate is also presented. The hazard ratios indicate the hazards of conceiving, compared to the reference category (indicated in *italic*). Lower rates of conceptions (conception cumulants) were observed for women who attained a higher education level, lived within 1km of a road, were separated, widowed or never married, already had 5+ children, used contraception, or wanted no more children.

Women who used traditional methods to prevent pregnancy have higher conception cumulants (8.8) than women who use no contraception (6.2) (a conception cumulant is a

similar measure to total fertility). Presumably this is because women who are using traditional methods are sexually active on a more regular basis, but are not using a reliable method and so are at higher risk of pregnancy, whereas women who use no contraception include some who are less frequently sexually active or abstaining and so are at lower risk of pregnancy. The conception rate for women using condoms (5.3) is only slightly lower than women using no contraception. There are small numbers of OCP users, making the conception rate of 6.4 hard to interpret. Women using 3-month injectables do have lower conception rates (3.1) but it is women who report using implants/IUDs (1.4) or sterilisation (0.1) that have significantly lower conception rates, demonstrating that long-acting and permanent methods are the most effective methods to reduce pregnancies and fertility.

Although women who want a child within 2 years, or 2 years or more do have higher conception rates (8.7, 4.5 respectively), it is notable that women who report wanting no more children have a conception rate of 2.9.

Table 4.13 Conception rates by background factors, together with hazard ratios

	Births	Person Years	Rate per 1,000	Rate 95% CI	Hazard ratio	Hazard ratio 95% CI	Conception Cumulant ^a
Age							
15-19	423	2238	189.0	171.7-207.8	0.7	0.6-0.8	0.9
20-24	597	2290	260.7	240.6-282.4	1		2.2
25-29	524	2259	232.0	212.9-252.8	0.9	0.8-1.0	3.4
30-34	343	1971	174.0	156.5-193.4	0.8	0.7-0.9	4.2
35-39	161	1524	105.6	90.5-123.2	0.5	0.4-0.7	4.8
40-44	50	1131	44.2	33.5-58.3	0.3	0.2-0.4	4.9
45-49	4	909	4.4	1.7-11.7	0.0	0.0-0.1	5.0
Education							
<i>None/ Primary 1-5</i>	280	1792	156.3	139.0-175.7	1		5.8
Primary 6-8	1233	7081	174.1	164.7-184.1	0.9	0.8-1.0	5.3
Secondary +	586	3444	170.2	156.9-184.5	0.8	0.6-0.9	4.5
Residence							
<1km	813	5607	145.0	135.4-155.3	1		4.3
>=1 km	1289	6718	191.9	181.7-202.6	1.3	1.2-1.5	5.7
Marital status							
<i>Currently Married</i>	1840	9002	204.4	195.3-214.0	1		6.3
Separated	105	1084	96.9	80.0-117.3	0.5	0.4-0.6	3.3
Widowed	17	466	36.5	22.7-58.6	0.4	0.3-0.7	1.5
Never married	140	1539	90.9	77.1-107.3	0.3	0.2-0.4	2.5
Parity							
0	121	229	527.9	441.7-630.8	1		5.8
1-4	1388	6495	213.7	202.8-225.2	0.4	0.3-0.5	5.1
5+	386	3783	102.0	92.4-112.7	0.4	0.3-0.5	2.7
Contraceptive use							
<i>Not using modern method</i>	1532	7341	208.7	198.5-219.4	1		6.3
Using modern method	471	4171	112.9	103.2-123.6	0.5	0.5-0.6	3.3
Contraceptive use - method							
<i>None</i>	1464	7097	206.3	196.0-217.1	1		6.2
Traditional	68	244	278.3	219.4-353.0	1.4	1.1-1.8	8.8
Condoms	210	1082	194.2	169.6-222.3	0.8	0.7-0.9	5.3
OCP	38	176	215.6	156.9-296.3	0.9	0.7-1.3	6.4
Injection	208	1702	122.2	106.7-140.0	0.5	0.4-0.6	3.1
Implant/IUD	13	215	60.4	35.1-104.0	0.3	0.2-0.5	1.4
Sterilisation	2	997	2.0	0.5-8.0	0.0	0.0-0.1	0.1
Fertility intention - simple							
<i>Want no more</i>	333	4896	68.0	61.1-75.7	1		2.9
Yes - want more	1080	5574	193.7	182.5-205.7	1.8	1.6-2.1	5.0
Unsure	46	373	123.3	92.4-164.6	1.3	1.0-1.8	3.7
Fertility intention - time dimension							
<i>Want no more</i>	333	4896	68	61.1-75.7	1		2.9
Want, Wait 2+ years	568	3690	153.9	141.8-167.1	1.3	1.1-1.6	4.5
Want, within 2 years	416	1194	348.5	316.6-383.7	3.2	2.8-3.8	8.7
Want, unsure when	96	691	138.9	113.7-169.7	1.3	1.0-1.7	3.8
Unsure	46	373	123.3	92.4-164.6	1.3	0.9-1.8	3.7

Italic indicates reference category for hazard ratios

^a Conception cumulants indicate the total number of conceptions that would be expected if the woman were exposed to each background factor up to age 50. However, for age-group, we are cumulating to the end of each age-group, not to age 50.

Age-specific conception rates are presented by family planning, and fertility intention, and these figures demonstrate that women age 15-35 contribute the most conceptions (Figure 4.2 and Figure 4.3). This is likely to be due to fecundity, level of sexual activity, and may also be associated with poor use of contraception or use of less effective short-term methods amongst this age group.

Figure 4.2 Age-specific conception rate by family planning

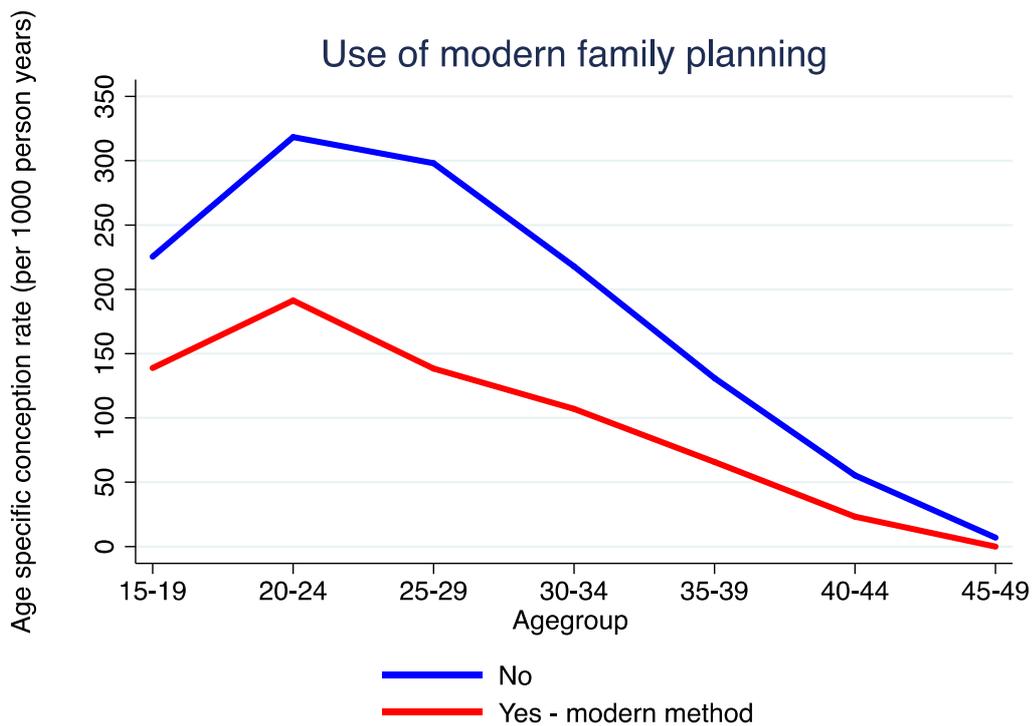
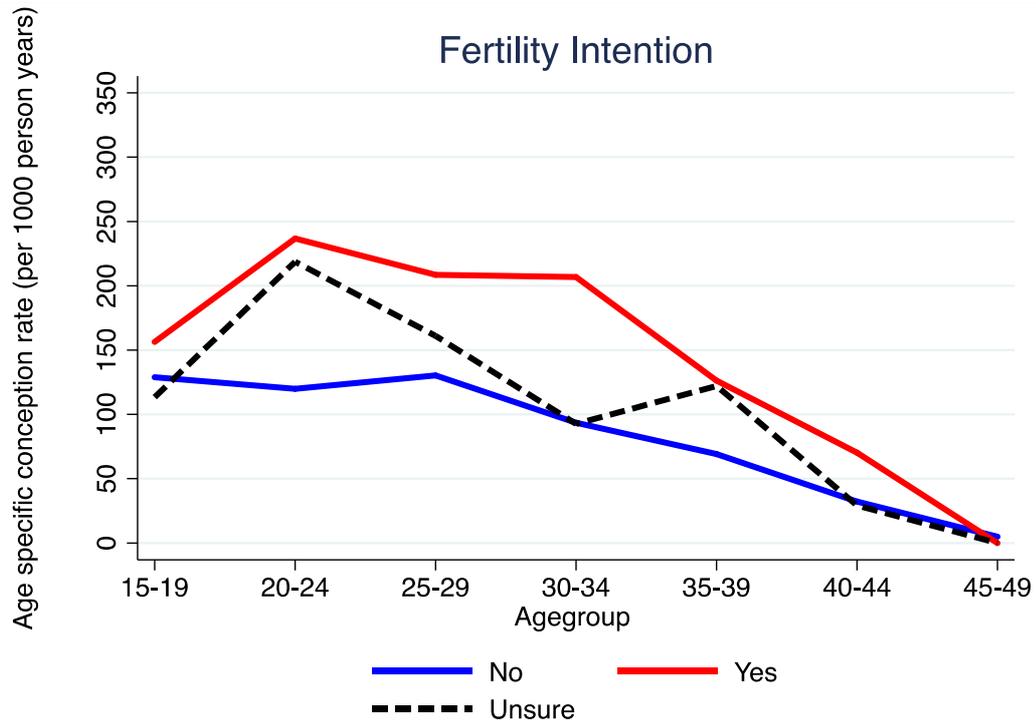


Figure 4.3 Age-specific conception rate by fertility intention



No=No more children. Yes=Wants more children

4.4.6 Probability of conceiving

The proportion of women who go on to conceive within one and two years of being interviewed, are presented by fertility intention and contraceptive use. Women who want a child within two years have a 46.5% chance of having a conception within two years, as compared to 25.0% who reported they wish to wait 2 or more years, and compared to 11.9% of women who said they want no more children (Table 4.14). A test for equality of survivor functions demonstrates these differences were statistically significant ($p < 0.001$). This suggests women are operationalizing their intentions to some degree.

Table 4.14 Proportion of women who conceive in 1 and 2 years since reporting her fertility intention (with the time component).

Fertility intention	Years	Probability of conceiving (%)	95% confidence interval
Want no more	1	6.5	5.6 – 7.5
	2	11.9	10.6 – 13.3
Want, wait 2+ years	1	13.4	12.0 – 14.9
	2	25.0	23.1 – 27.0
Want, within 2 years	1	30.8	27.8 – 34.1
	2	46.5	43.1 – 50.1
Want, unsure when	1	13.7	10.9 – 17.2
	2	21.5	17.7 – 26.1
Unsure	1	14.9	10.5 – 21.0
	2	20.9	15.6 – 27.9
All women	1	16.5	15.7 – 17.4
	2	29.4	28.3 – 30.6

Of women who reported not using a modern method of contraception, 35.6% had a conception within two years, as compared to 9.9% of women who reported using an implant/IUD (Table 4.15). This difference was statistically significant ($p < 0.001$).

Table 4.15 Proportion of women who conceive in 1 and 2 years since reporting her contraceptive method.

Contraceptive method	Years	Probability of having a conception (%)	95% confidence interval
None	1	19.3	18.2 – 20.5
	2	35.6	34.0 – 37.2
Traditional	1	23.3	17.2 – 31.2
	2	40.8	33.3 – 49.4
Condoms	1	17.5	14.8 – 20.6
	2	28.6	25.3 – 32.4
OCP	1	23.4	16.5 – 32.6
	2	32.1	24.2 – 41.7
Injection	1	10.2	8.3 – 12.5
	2	20.2	17.6 – 23.1
Implant / IUD	1	5.7	2.6 – 12.3
	2	9.9	5.4 – 17.6
Sterilisation	1	0.2	0.0-1.5
	2	0.2	0.0-1.5
All women	1	16.5	15.7 – 17.4
	2	29.4	28.3 – 30.6

4.4.7 The role of contraception in the relationship between fertility intentions and conceptions

Three parametric (piecewise exponential) models are run to explore the role of other variables on the relationship between fertility intentions and conceptions (Table 4.16).

Women who want a child are 1.84 times more likely to have a conception than women who do not want any more children ($p < 0.001$), controlling only for age (model 1). Controlling for age, educational attainment, residence, marital status and parity (model 2), the hazard ratio of having a conception for women who want another child stays almost the same at 1.87 ($p < 0.001$), suggesting there may not be confounding from these additional variables.

Residence, marital status, and parity are all also associated with conceptions and are likely to be acting independently from fertility intentions. Women who live more than 1km from a road, are currently married, or have no children are more likely to have a conception.

Education appears to be the least important independent predictor of conceptions when allowing for the other factors, probably because it acts through fertility intentions. Those with secondary education are 0.81 ($p = 0.032$) times less likely to have a conception than women with the least education and the wide confidence intervals (not shown in table) span 1.

In order to explore whether contraception is on the causal path from intentions to conceptions, an informal test is run using model 3. Model 3 is an extension of model 2, including contraceptive use. All the hazard ratios weaken (become closer to 1.0), apart from marital status. The hazard ratio for fertility intention in model 3 weakens slightly to 1.66 ($p < 0.001$), suggesting that including contraception in the model moderately reduces the effects of fertility intentions on conceptions. A likelihood ratio test suggests that model 3 (which includes contraception) fits the data better than model 2 ($p < 0.001$). This provides some evidence that contraception is on the causal path as per the hypothesized conceptual framework, but intentions retain much of their predictive power, indicating that they have an independent effect beyond their action through contraceptive use.

Table 4.16 Three models presenting hazard ratios of conceptions, using piecewise exponential regression

Model 1: Simple model looking at the age-adjusted hazard ratios by fertility intention.

Model 2: Age-adjusted hazard ratios by fertility intention, controlling for education, residence, marital status and parity

Model 3: Age-adjusted hazard ratios by fertility intention, controlling for family planning, education, residence status and parity.

Variable	Category	Model 1		Model 2		Model 3	
		Hazard Ratio	p-value	Hazard Ratio	p-value	Hazard ratio	p-value
Age group	15-19	0.67	<0.001	0.68	<0.001	0.67	<0.001
	<i>20-24 (reference)</i>						
	25-29	0.91	0.198	0.90	0.191	0.92	0.246
	30-34	0.79	0.007	0.75	0.003	0.76	0.005
	35-39	0.54	<0.001	0.53	<0.001	0.56	<0.001
	40-44	0.25	<0.001	0.24	<0.001	0.25	<0.001
Fertility intention	45-49	0.04	<0.001	0.03	<0.001	0.04	<0.001
	<i>No more</i>						
	Want more	1.84	<0.001	1.87	<0.001	1.66	<0.001
Education level	Unsure	1.33	0.069	1.48	0.019	1.30	0.118
	<i>None/ primary 1-5</i>						
	Primary 6-8			0.89	0.163	0.91	0.241
Proximity to road	Secondary+			0.81	0.032	0.84	0.067
	<1km						
Marital status	>1km			1.28	<0.001	1.24	<0.001
	<i>Currently married</i>						
	Separated			0.73	0.006	0.69	0.001
Parity	Widowed			0.60	0.061	0.52	0.017
	Never married			0.54	0.019	0.50	0.008
	<i>None</i>						
Use of modern contraception	1-4			0.36	<0.001	0.39	<0.001
	5+			0.40	0.001	0.44	0.003
	<i>None</i>						
	Condoms					0.96	0.635
Use of modern contraception	OCP/ injectables					0.67	<0.001
	Implant / IUD / sterilisation					0.13	<0.001

Italic indicates reference group

4.5 Discussion

Almost half of the study participants (44.3%) reported they want no more children.

This is in line with the DHS which estimates 47% of women desire no more children[1].

Women who reported wanting no more children were more likely to use long-acting or permanent methods of contraception, but nonetheless there was a 58% (95% confidence interval 0.56-0.61) probability that a woman who wants no more children was not using any

modern method of contraception. The women who were sexually active but were not using contraception were at risk of unintended pregnancy.

The probability of conceiving was higher for women who wanted a child than for women who did not want a child. Conception cumulants were higher for women who reported they want a child within two years (8.7) and women who wanted to wait at least two years (4.5), but nevertheless women who reported they want no more children have a conception cumulant of 2.9. Presumably these are unintended children, or children born to women who change their minds. Conception cumulants were high for women using short-term methods of contraception (5.3, 6.4, 3.1 for condoms, OCP and injectables respectively). The hazard ratio of conceiving for women who want another child is 1.87 ($p < 0.001$), and multivariate analysis demonstrated that age, education, marital status, parity and residence do not explain this relationship. Overall, the analysis has demonstrated that there are high numbers of conceptions, and that many women who a) don't want any more children and/or b) report using contraception, go on to contribute at least one more birth.

The fact that there is a clear difference in conception rates by fertility intention is evidence for the validity of the fertility intentions variable, showing that it is capturing some aspect of what it is hypothesised to mean. The findings demonstrate that some women are translating their intentions into achieved conceptions and ultimately births, controlling for other factors, and this largely confirms the pathways of influence, hypothesised in the conceptual framework. Nevertheless, there are a notable number of women who want no more children but who do go on to have at least one additional conception, and presumably these children were unintended at the time of conception, and the mothers were not translating their desires into actions to control their fertility. This supports the findings of earlier work conducted in the study area[76], and suggests services must be strengthened in order to enable women to achieve their fertility goals.

Long-acting and permanent methods of contraception were very effective at reducing conceptions, but women who used short-term methods contributed to a considerable number of conceptions. In particular, the failure of condoms and OCP to

reduce conceptions may be due to improper use of the method resulting in method-failure, over-reporting of contraception use in the survey, or inconsistent use and stopping the method after interview and hence a limitation in the assumption about the meaning of these time-varying covariate. Furthermore, some condom use may be for HIV prevention, and this makes contraceptive use of condoms harder to interpret. Unlike other methods, condoms may be used with one partner and not another. Women using traditional methods of contraception contributed many more conceptions than women using no method, but this is likely to be due to differences in sexual activity. By inference, women using traditional methods of contraception are sexually active. This finding demonstrates that sexually active women who are not using modern contraception contribute a disproportionately high number of births, perhaps contributing to the paradox of high fertility in Malawi despite a high population level contraceptive prevalence rate. The implications of these findings suggest a re-focus on provision of long-acting methods of contraception[143], as these have most impact on reducing unwanted conceptions.

The hazard ratios of conception also vary by marital status, parity, and residence. There is no strong effect of school education on reducing conceptions, contrary to what would be expected under economic theories of fertility[144], probably because it acts through fertility intentions. This was an interesting finding, given that education is widely promoted as an intervention to lower population-level fertility rates. Clearly education is a good thing and should be promoted for a wide variety of reasons. But this chapter has not provided evidence that education has a direct impact on fertility outcomes. Education is more likely to act through intentions, and through giving women the knowledge and independence of mind to use modern contraceptives to achieve these aims. Therefore, other strategies aimed at reducing high fertility rates – such as communication activities to encourage couples to *want* to have smaller families – might be more effective.

From an informal test, contraceptives only partially modified the intention-conception link, providing weak evidence that contraception is on the causal path. All the hazard ratios weakened when contraception was included in the model, apart from marital

status. This suggests the direct impact of marital status on conception may be more important than the indirect effect through contraception. However, for fertility intentions and the other variables, a more complete exploration of pathways may be warranted.

It is possible that abstinence “dilutes” the relationship between contraception and fertility outcome, providing an alternative pathway from intentions to conception, as suggested in the causal pathway diagram. It was found that 6.5% of married women had not had sex in the last 12 months, and so they were not at risk of conceiving. Unfortunately, abstinence was not fully explored in the sexual behaviour survey, with questions on sexual frequency limited to married women. A more complete survey exploration linked to statistical approaches such as dynamic path analysis would provide a better guide to capturing the extent of mediation and providing fuller descriptions of the causal pathways.

The quality of the contraception data may also have contributed to the relative weakness of the impact of short-term methods of contraception. The contraception variable represents a response recorded in an interview, at a particular time. Alternative approaches to measuring contraception that are able to more accurately capture contraceptive use and changes in use, may be more appropriate. One such alternative to measuring contraception is presented in Chapter 5. Chapters 6 and 8 report findings from this study method that shed light on uptake, switching and stopping contraception, all of which are more subtle predictors of the impact of contraception on conceptions and fertility, and may be neglected factors in the simple contraceptive use-fertility nexus.

The strengths of the study were that the data were longitudinal and covered a large study population. The availability and potential for linkage of prospective fertility intentions reports, contraception data, and births recorded to a very high quality by the DSS, provided a unique opportunity to explore the relationship between fertility intentions and conceptions. There were also a number of weaknesses. The outcome of interest was conceptions that resulted in a full-term birth, including live and stillbirths. However there are also pregnancies that would not have resulted in full term births, including early miscarriages and abortions. These were missed from the analysis because it had not been possible to collect

these data, due to social taboos and legal restrictions concerning abortion, and difficulty in collecting miscarriage data. However, this would only influence the conclusions if there were a relationship between conceptions that did not go to term and: intentions, contraception, and the other possible determinants considered here. One might expect such a relationship with intentions (i.e. through induced abortion) but there is unlikely to be a relationship with the other determinants. We suspect induced abortions are rare in the study area, and so are not concerned that bias was introduced by focusing on live births and stillbirths.

It was not possible to explore the role of abstention on the relationship between fertility intentions, contraception, and conceptions. Had abstention been controlled for, it is likely that contraception would have been a more powerful predictor of conceptions.

There were also challenges with measuring fertility intentions. There is the potential for misunderstanding the question, and some women may have a more fatalistic approach to childbearing that could render the variable meaningless. Additional unmeasured influences of societal norms, relationships, and previous reproductive experiences make fertility intentions all the more difficult to unpack. Even in circumstances where a woman does have her own intentions, external factors such as pressures from husband and family, and social pressures and norms to have children may be greater than her own aspirations [145-147]. Attitudes and behaviours are not always consistent, nevertheless, they are a good starting point for exploring women's reproductive aspirations.

The analysis made some assumptions around handling time-varying covariates, due to the nature of the data that were available. Time-varying covariates were assumed to have changed mid-way between two surveys, and there is a chance that some women were assigned inaccurate time in changing categories as a result of this assumption, which would weaken the effects of fertility intentions and contraception on resulting conceptions. Although more women than not gave consistent reports between interviews, this chapter has demonstrated that fertility intentions and contraceptive status do change between survey rounds (Kodzi and colleagues found a similar proportion of women changed their fertility

preferences between successive interviews in rural Ghana[122]), and are inherently unstable. Reported fertility intentions were stable between rounds on 80.8% of occasions. This analysis has emphasized the importance of allowing fertility intentions to change over time when using them as explanatory variables for conceptions or fertility, supporting previous research in the area[120]. That there is significant change in contraceptive status between interviews is in keeping with Chapter 6 of this thesis, where we will observe inconsistent use of contraception.

The length of time between surveys was not associated with increased stability of fertility intentions and contraceptive use, but intervening changes in family circumstances were somewhat important[117, 148]. As there was only moderate variation in the stability of fertility intentions and contraceptive use by changes in family circumstances, it suggests they are inherently changeable, regardless of background family situations. However, the birth of a child reduced the stability of women's intentions and contraceptive use between rounds. Considering the pathways of influence as outlined at the beginning of this chapter, these findings demonstrate that fertility intentions and contraceptive use change when there is a birth or change in marital status, but there is also additional unexplained change on top of these events. Contraceptive use might be changed by changes in fertility intentions, but may also be unstable due to stock-outs, poor access to services, side-effects, or coping with a husband's disapproval.

These data provided a rare opportunity to explore whether women operationalize their fertility intentions, which has not before been possible using other studies and datasets. The next four chapters are presented as research articles, and focus on women's contraceptive use dynamics, and reasons for choices and changes.

5 Paper B: Quantitative Methods

5.1 Introduction

As suggested in Chapters 1 and 3, there is need to explore alternative methods of collecting contraception data, as conventional assessments are not always in a position to shed light on contraceptive switching and discontinuation, nor to produce an *actual contraceptive prevalence rate*. Chapter 4 demonstrated that there is some evidence of contraception being on the causal path from fertility intentions to conceptions. Because intuitively contraception *must* be on the causal path, it raises additional concerns over the quality of cross-sectional contraception data. They simply represent a self-report of contraception use by the woman at that particular time.

The largest part of my PhD work was the undertaking of a large quantitative family planning card study. The methods of this innovative study are described here in a stand-alone paper, in order to describe the steps undertaken to collect provider-recorded contraception data on patient-held records, and build a prospective longitudinal dataset. This method potentially offers a more accurate picture of contraceptive use than can conventional methods, and allows researchers to answer additional questions on contraceptive dynamics (switching and discontinuation). The materials for the quantitative study are presented in Appendix A.

The paper presented in this thesis was prepared for *Demographic Research*. However it was rejected on the grounds that a methods paper describing a new data collection approach was not suitable for *Demographic Research*. The paper was therefore shortened and submitted as a 1,500 word paper to the “Lessons From the Field” section of *The WHO Bulletin*. However, the longer version that was submitted to *Demographic Research* is presented here in this thesis as it is longer and more detailed, and the examiners will find it clearer.



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AD, AC, BZ Conceived the project. AD, AC, BZ, RN, LG, FT, BN Contributed to study design. AD, AC, RN, LG Supervised data collection. KB programmed data entry. AD Cleaned and analysed the data and drafted the manuscript. All authors read, revised and approved the article.

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5.2 “The potential for patient-held records in reproductive health research”

START OF RESEARCH PAPER

5.2.1 Abstract

Background

Women in Malawi bear on average six children, with many unintended pregnancies. Although 42% of married women report using modern methods of contraception, 26% report an unmet need[1]. Apart from retrospectively reported contraceptive calendars, conventional assessments of contraceptive use are not designed to assess contraceptive switching or discontinuation.

Study Design

An innovative method was devised for collecting family planning (FP) data using patient-held records (a “FP card”) to build a prospective longitudinal dataset, allowing exploration of continuity of use and provider/method-switching, linked to data from a demographic surveillance site (DSS) in northern Malawi. All 7,393 women aged 15-49 living in the DSS were offered a FP card. When issuing contraceptive supplies, the health provider recorded data on the recipient’s FP card. After one year, the FP cards were collected for analysis.

Results

Data are available for 4,678 (63.3%) women. An estimated 87.3% of provider-client contacts were captured on the FP cards by the health care provider. Lower cadres of health care providers were more diligent at recording data on the FP cards than higher cadres.

Conclusions

This new method will enable a better understanding of how women “shop around” for contraceptive services, and whether they maintain continuity of use. There is some evidence of participation bias, but a number of techniques have been developed to reduce misreporting and to quantify the likely extent of underreporting.

Keywords: Malawi, contraception, family planning, discontinuation, switching, patient-held records, demographic methods

5.2.2 Introduction

Providing access to voluntary contraceptive services is important, not only because of the direct impact on reproductive health outcomes, but also because contraceptive use is thought to be on the causal pathway to improvements in health and socio-economic outcomes [21-23]. It is important to measure accurately rates and trends of contraceptive use, in order to evaluate progress made towards targets such as Millennium Development Goal 5, to improve maternal health [23, 24, 37].

Women in Malawi bear on average 5.7 children, and many pregnancies are unintended or occur sooner than desired. Although 42% of married women report using modern methods of contraception in cross-sectional surveys – higher than in neighbouring sub-Saharan countries – the total fertility rate (TFR) remains high and 26% of women are estimated to have an unmet need for contraception for either spacing or limiting births [1]. There are a number of possible explanations for Malawi's paradox of high fertility despite increased contraceptive use. One explanation is over-reporting of contraception in cross-sectional surveys, where a woman might report herself as a contraceptive user, even if in reality she is late for a repeat appointment, and has essentially discontinued a short-term method. Contraceptive switching and discontinuation are key, because as desired family size declines and the contraceptive prevalence rate (CPR) increases, effectiveness and duration of use become increasingly significant determinants of total fertility, unintended pregnancies and induced abortions[84].

Data on family planning (FP) come from a variety of sources, including routine health facility data, cross-sectional surveys, and retrospective surveys. The Demographic and Health Survey (DHS) has developed a contraceptive calendar which captures self-reported contraceptive status (and method), pregnancies, births, breastfeeding and terminations for every calendar month for the five years prior to interview. These data do not suffer from problems of loss to follow-up, although there is selection bias as only women surviving to interview can report, and there are likely to be memory recall issues with the

earliest data. With the exception of this retrospective calendar method, conventional assessments of contraception are not always in a position to capture switching or discontinuation. Single-country studies on contraceptive switching or discontinuation that use data other than DHS are not very common, as the data tend to be difficult to collect and analyse. Thus, much of the work has been on cross-country comparative reports, often using data from the calendar section of the DHS questionnaire[84-92].

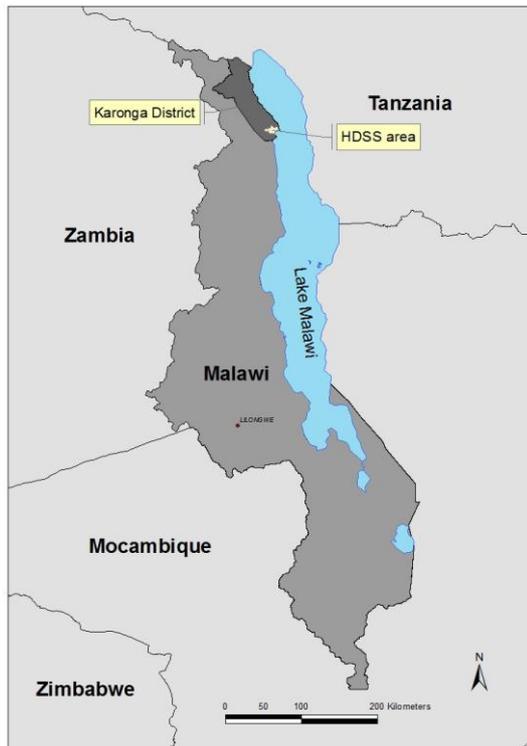
Using 2004 DHS data, Ali and colleagues find high contraceptive discontinuation rates in Malawi[89]. Compared to 17 other developing countries, they found that Malawi had the lowest proportion of women who switched to another modern method of contraception within three months of method-related discontinuation, suggesting poor switching behaviour, in the context of discontinuation[89].

Evaluations of the calendar method suggest it is fairly robust and reliable[84]. It has been shown to reduce heaping of reports on integer years (avoiding biases in measuring duration of use), compared to standard questionnaires [102, 103]. However, Strickler and colleagues argue that contraceptive discontinuation and failure rates may not be accurate using calendar data[149]. Methods that are delivered at unique specific dates such as sterilisation could be easier to recall than other methods and so the calendar method may be more or less accurate depending on the method-mix in a country. A study from Bangladesh found poor consistency between reports from a baseline interview compared to reports in a follow-up survey where women were asked to retrospectively report on their contraceptive use for the same month as the baseline survey[104]. This was especially so for women with complex reproductive histories. This calls for an exploration of prospective methods for collecting data, which may more reliably capture contraceptive switching (of methods or facilities) or discontinuation.

In Malawi, there is relatively good coverage of family planning services, and there are a range of contraceptive methods provided through different mechanisms (public, private, clinic, outreach[52]) and service providers (Clinical Officers, Nurses, Medical Assistants, Health Surveillance Assistants (HSA), and volunteer Community Based

Distribution Agents (CBDA) [53, 54, 61]). Women are expected to carry a “health passport” (patient held medical record) with them when they utilise health care services. Newer health passports contain a dedicated family planning page where the health care provider can record details of contraceptive services provided.

Figure 5.1 Karonga District, Malawi



Source: Karonga Prevention Study maps

The Karonga Prevention Study (KPS) operates a demographic surveillance site (DSS) in northern rural Malawi (Figure 5.1), with 36,524 individuals in 8,076 households under observation at the end of 2012[45]. Recent studies nested within the DSS have focused on adult HIV, sexual and reproductive behaviour and on fertility intentions[36, 76, 142, 150]. The Karonga DSS is an ideal setting for observational studies of contraception because of a) the close links the project has with the health facilities and providers of contraception, and the opportunity to collaborate with the district FP team, b) the ability to link new contraception data to the DSS database using identifying information, which will

provide a wealth of explanatory variables to explore, c) the availability of related data (e.g. on fertility intentions, marital history, parity and HIV status), and d) the large number of potential study participants living within the DSS.

Patient-held records have a potentially important role for monitoring continuity of use of health services [151, 152]. In this article, we describe an innovative method for using such records to collect contraception data, capturing provider data to build a prospective longitudinal dataset which will allow exploration of continuity of use and method switching, and validation of cross-sectional estimates of contraceptive use, which can be linked to the DSS database. We provide results on study recruitment, and evaluate the potential of patient-held records for collecting contraception data.

5.2.3 Materials and Methods

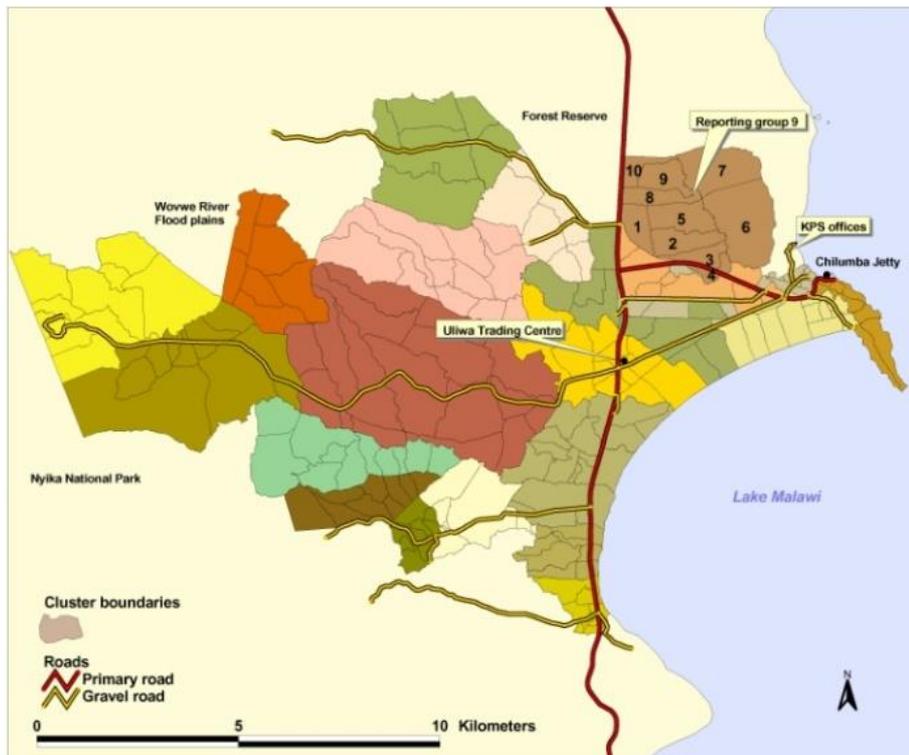
In summary, all consenting women aged 15-49 living in the Karonga DSS were offered a family planning card (“FP card”). When a woman accessed a FP service, the health provider recorded on her FP card the date, method received (or advice given) provider-type, and where the service was delivered. After one year, the FP cards were collected by KPS for data entry, linkage to the DSS database, and analysis.

Community sensitization

Approval was sought from Traditional Authority, Village Headmen, the Area Development Committee and the District Health Management Team prior to starting the study. Following this, sixteen community sensitization activities – combining local dance/song troupes (which attracted large audiences) and KPS staff members – were designed to explain the study aims and data collection methods of this and two other studies starting simultaneously, and to answer any questions. These activities were undertaken with

the aim of addressing potential misconceptions among the local community and to give a greater understanding of the nature of the study to improve the quality of the consenting process.

Figure 5.2 Karonga DSS area



Source: Karonga Prevention Study maps

Issuing Family Planning cards to the study population

The DSS is split into 21 reporting groups, which in turn are divided into 278 clusters (Figure 5.2). Each cluster has a Key Informant who lives in the villages and has been trained by KPS to use formatted registers for recording and subsequently notifying KPS of vital events and migrations[46]. As part of this contraception study, KPS staff trained the 278 Key Informants to distribute the FP cards between January-April 2012. Thirty separate sessions were held where Key Informants were trained to use listings of the (approximately 25-40) women of reproductive age living in each cluster. The Key Informant was asked to

visit all women on his/her list, explain the study, and – if she agreed – to staple the FP card (with pre-printed identification information for each woman) to the inside front page of the woman's health passport. The list was updated to reflect whether or not the woman accepted the FP card. The list was returned to KPS in a second meeting held roughly 10 days after the initial training, along with any remaining FP cards. A small payment was given to the Key Informants in recognition of their efforts. There was a range in skills, education-level and age of the Key Informants. For those who struggled, a KPS staff member either re-visited them to assist with the task, or matched that Key Informant with another who had demonstrated their competency, so that they could work together.

Health care providers record data

All 132 health providers working in the area – Clinical Officers, Nurses, Medical Assistants, Health Surveillance Assistants (HSAs) and volunteer Community Based Distribution Agents (CBDAs) – were trained in six separate sessions, to record information on the FP cards (method, date, where the service was provided, and their own individual 3-digit staff code which identified them and their staff cadre), whenever they provide a contraception service or gave contraception advice, to a woman who had a FP card. Three subsequent refresher trainings were conducted for all health providers. Motivational text-messages were sent to participating health providers on five occasions (July, October, November 2012 and January, March 2013), to encourage them to continue recording information on the cards. The Karonga district FP coordinator (author – R.N.) who was closely involved with the study and the running of the health provider trainings, designated this task to be part of their record-keeping responsibilities. All providers were given mobile phone air-time, so they were able to call the study mobile phone number in case of any questions.

An interim audit of 379 FP cards (review of cards without collection) was carried out six months after issuing the cards, to evaluate whether the study methods were working,

and whether the health care providers were recording data on the cards. Data from this exercise are not presented here, but the study leaders were satisfied that field-work was progressing successfully.

Collecting the FP cards

Allowing for one year of data collection, the FP cards were collected by KPS staff at pre-arranged gathering places in February-May 2013. Efforts were made to locate women who had moved through the study year, using up-to-date migration information from the DSS database. KPS staff filled in any missing contraception episodes upon collecting the card, by checking her health passport to see if any events were recorded elsewhere in the passport that were not recorded on the FP card, and also asking the woman herself to report on her family planning encounters over the previous year. The information source for each episode: (FP card, health passport, or the woman's verbal report) was recorded. As a result, most of the data were collected in a prospective format (using the health care provider written reports), but gaps in data were filled in using a retrospective reported method (from the woman), achieving a more complete and accurate dataset than is possible using traditional methods. In the event that a woman had previously had a tubal ligation, implant or IUD prior to receiving the FP card, this was duly recorded as an explanation why her FP card was blank.

At the time of collection each woman provided individual informed written consent for the analysis of the data recorded for the purposes of this study. Consent was not taken at the beginning of the study because Key Informants are not KPS staff and could not administer the informed consent procedure. Women were compensated for their time attending the collection session. A smaller number of FP cards were collected after data-collection had officially finished, as part of an opportunistic "mop-up" operation for up to three months, as and when Karonga DSS field-staff met a woman who had not yet submitted her card, and informed consent was also taken at this time.

Analysis methods

The new contraception data were linked to the KPS database, using unique identifying information for each woman, and Stata 12 (Stata Corp, College Station, Texas, USA) was used to manage and analyse the data.

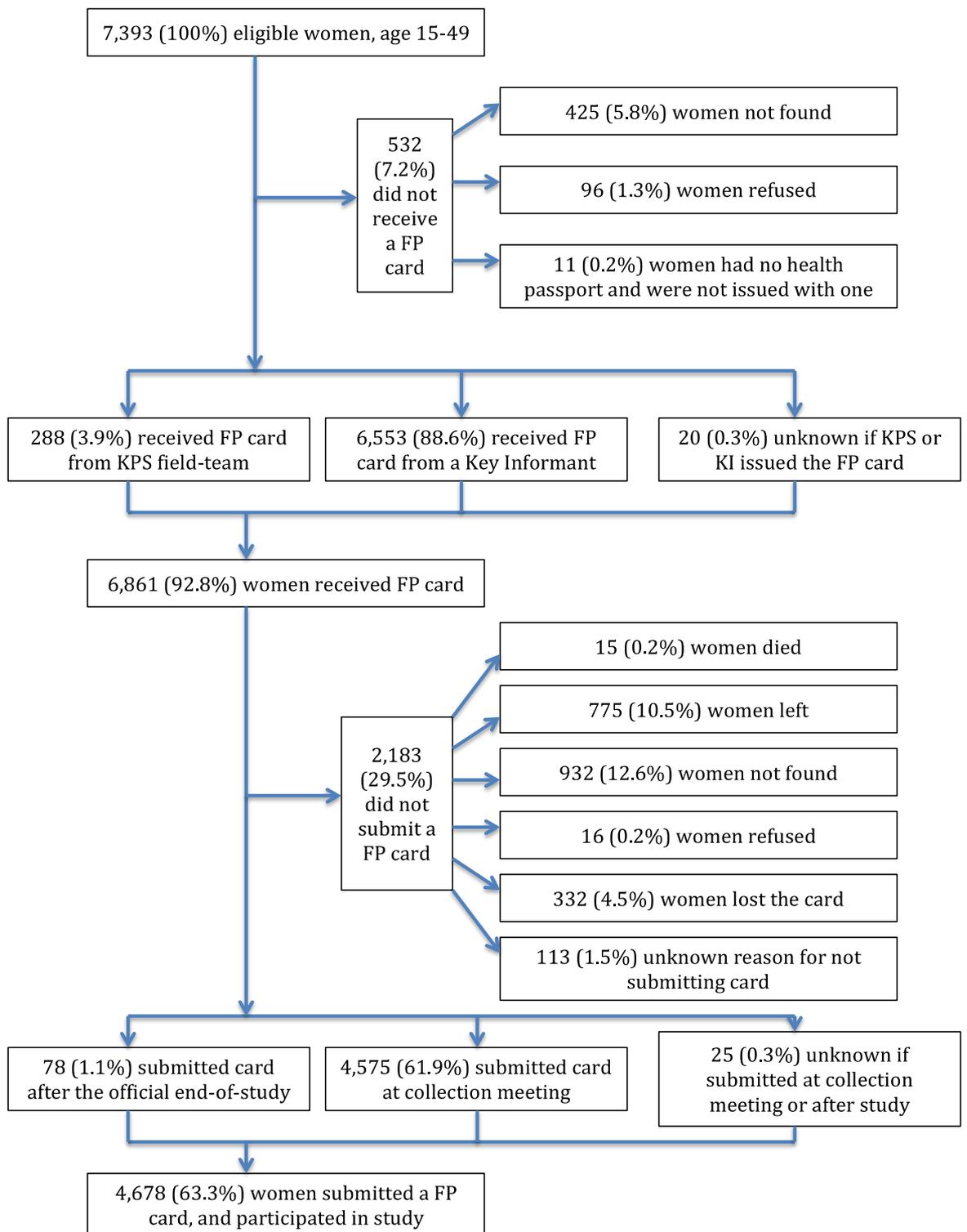
Descriptive statistics comparing eligible women and participants and data sources are presented here to evaluate the performances of the method. In future publications, the data collected will allow description of the profile of contraception users, calculation of an effective-contraceptive prevalence rate (CPR), examination of method-switching, and an exploration of the extent of contraceptive discontinuation, and post-partum uptake of contraception. Provider switching (of either the facility, staff cadre, or location where the service was delivered) will also be examined.

5.2.4 Results

Study recruitment

Details of recruitment to the study are presented in Figure 5.3. Of 7,393 eligible women aged 15-49, 6,861 (92.8%) were issued with an FP card. Acceptance of the card was highest in the 40+ age-group (95.7%), and lowest in the under-20 age-group (89.7%). Cards were predominantly issued by Key Informants (88.6%). The main reason for not issuing a card was that the woman could not be found (5.8%), and actual refusals were low (1.3%).

Figure 5.3 Details of recruitment to the study: women eligible & participating



By the end of observation time, 2,183 (29.5%) FP cards were not collected. Inability to find the woman, or women leaving during the study period were the most common

reasons at 12.6% and 10.5% respectively. Other women (4.5%) had lost the card during the follow-up period and so were not able to participate in the analysis.

The majority of women submitted their card at the pre-arranged collection meetings (61.9%), but a handful of women were able to submit their cards to KPS staff at a later date. Overall, FP cards were collected from 4,678 women, meaning 63.3% of all eligible women participated in the study.

The profile of all eligible women, women who received a FP card, and women who submitted an FP card are described in Table 5.1. Study participants (those who submitted a FP card) and non-study participants were compared, to see if there was bias in recruitment. Study participants were more likely to be slightly older, currently married, want no more children, have already had 5 or more children, and have achieved lower levels of education. There was no difference in HIV status.

Table 5.1 Profile of all eligible women, women who received a FP card, and women who submitted a card at the end of the study (study participants), compared to non-participants.

	All eligible women		Received a FP card ^a		Study participant		Not a study participant ^b	
Mean age	29.0		29.2		30.4		26.6	
	N	%	N	%	N	%	N	%
Marital status			p<0.001		p<0.001			
Currently married	4,923	66.9	4,668	68.3	3,419	73.2	1,504	55.8
Separated/ widowed/ divorced	993	13.5	909	13.3	616	13.2	377	14.0
Never married	1,446	19.6	1,258	18.4	633	13.6	813	30.2
Total	7,362	100	6,835	100	4,668	100	2,694	100
Education			p<0.001		p<0.001			
Incomplete primary	548	7.4	524	7.7	355	7.6	193	7.1
Complete primary	4,203	57.0	3,980	58.1	2,870	61.4	1,333	49.3
Secondary+	2,628	35.6	2,345	34.2	1,449	31.0	1,179	43.6
Total	7,379	100	6,849	100	4,674	100	2,705	100
HIV status			p=0.329		p=0.916			
HIV positive	572	8.9	532	9.1	369	8.9	203	9.0
HIV negative	5,824	91.1	5,349	90.9	3,770	91.1	2,054	91.0
Total	6,396	100	5,881	100	4,139	100	2,257	100
Parity			p=0.001		p<0.001			
None	183	3.4	169	3.3	102	2.7	81	5.0
1-4	3,328	61.5	3,141	61.0	2,235	58.8	1,093	67.6
5+	1,905	35.2	1,837	35.7	1,463	38.5	442	27.4
Total	5,416	100	5,147	100	3,800	100	1,616	100
Fertility intention			p<0.001		p<0.001			
No more	2,110	42.1	2,023	42.8	1,559	45.7	551	34.4
Wait 2+ years	1,896	37.8	1,772	37.5	1,215	35.6	681	42.5
Want within 2 years	638	12.7	596	12.6	435	12.8	203	12.7
Unsure	369	7.4	337	7.1	203	6.0	166	10.4
Total	5,013	100	4,728	100	3,412	100	1,601	100

^a p-values from χ^2 test for different from “did not receive a FP card”

^b p-values from χ^2 testing difference between “study participant” and “not a study participant”

^c two-sample t test, testing difference between mean age

Women who had submitted their FP card at the pre-arranged gathering places were compared to women who submitted their card after formal data collection was completed. No significant difference was found in marital status, education, HIV status, parity or fertility intentions between these two groups at the p<0.001 level, suggesting the method of retrieving the card through collection meetings had not introduced bias in the sample, so the participation bias evident in Table 5.1 must have been introduced during recruitment, or because of factors affecting attrition.

Comparison of data sources

In order to evaluate the study method of using health care providers to record data on the FP cards, the source of data for each provider-woman contact (for tubal ligations, implants, IUD, injectables and oral contraceptive pills) was examined. The vast majority of data came from information recorded by the health care provider either on the family planning card (78.3%) or the health passport (9.0%) (Table 5.2). Nevertheless, 12.7% of provider-client contacts were not recorded on any paper health record but were reported retrospectively by the woman in a supplemental verbal interview. The fact that a considerable proportion of the data were not recorded at the time of service on any paper record has implications for our ability to measure continuity and provide credible evidence to future health care providers to give a consistent service, and potentially rules out using existing patient held records alone as a source of data on contraceptive continuation, in the absence of systems to strengthen this routine data collection. Fortunately for the purposes of this study, missing data that had not been recorded by the health care provider was completed by the KPS staff member upon collection of the FP card during their questioning of the women about her retrospective recall of contraceptive encounters. Male and female condoms were predominantly verbally reported by the woman, rather than recorded by the health care provider on the health passport or family planning card (data not shown), as they can be obtained from sources other than health-care providers. In these cases, rather than providing an account of each time they acquired or used condoms (which are subject to memory recall problems), ever-use of condoms over the study period was reported.

Health Surveillance Assistants and Community Based Distribution Agents were most diligent at recording information on the cards (80.2% and 81.0% respectively), with clinical officers least likely to record on either the FP card (58.3%) or health passport (9.0%) (Table 5.2), a phenomenon observed elsewhere as well[153, 154].

As further evidence of consistency between data sources, it was found that 100% of women who had reported in previous KPS cross-sectional sexual behaviour surveys that

they had undergone a tubal ligation, were correctly identified as such using the new data collection method.

Table 5.2 Provider-client contacts, by source of data and type of health care provider, for tubal ligation, implant, IUD, injectables, and oral contraceptive pills

Provider cadre	Family Planning Card		Health Passport		Verbally reported		Total	
	N	%	N	%	N	%	N	%
Clinical Officer	91	58.3	14	9.0	51	32.7	156	100
Medical Assistant	31	72.0	7	16.3	5	11.6	43	100
Nurse	386	75.0	78	15.1	51	9.9	515	100
Health Surveillance Assistant (HSA)	1,653	80.2	177	8.6	230	11.2	2,060	100
Community based distribution agent (CBDA)	277	81.0	5	1.5	60	17.5	342	100
Youth CBDA	6	100	0	0	0	0	6	100
Total	2,444	78.3	281	9.0	397	12.7	3,122	100

5.2.5 Discussion

Contraception data usually come from surveys or routine data collected at health facilities. These data do not track women over time, or link services received from different facilities or providers. There are currently no published reports of systems for linking data on contraception across facilities using reliable ID numbers, either for women living in Karonga or those in other DSS areas. The study outlined here is a new approach to collecting quantitative contraception data, using patient-held records. We hope our experiences are useful for others wishing to conduct similar prospective research, particularly in the context of existing DSS which can provide rich and reliable data on prior personal and family characteristics of potential FP users.

This study method will enable better understanding of how women “shop around” for services, and how they maintain continuity of use. Moreover, the method will allow for an examination of the *actual contraceptive prevalence rate*, whereas conventional cross-sectional estimates of CPR are at risk of over-reporting in cases where women classify

themselves as contraception users even if they are late for a repeat-appointment, and therefore have effectively discontinued.

Through engaging in a number of strategies to distribute and collect the FP cards from as many women as possible, we managed to collect contraception data from a large number of women. However, there was unavoidably attrition over the year due to loss to follow-up, card loss/damage, and refusals, and there is some evidence of selection bias, in that study participants are more likely to be older, married, have achieved lower levels of education, have had 5 or more children, and want no more children. This has implications for the way the contraception data should be interpreted, given the study participants are slightly different from the eligible population.

The close working relationship between the KPS and the district health office facilitated a good rapport between the study team at the KPS and the health providers who were responsible for the data collection. 87% of provider-client contacts were recorded by the health care providers, even though they are busy and not research trained. However, the study method is indeed prone to underreporting, and this had to be corrected by asking women to report retrospectively on their encounters with contraceptive service providers in order to fill in gaps. We found that repeat refresher training as well as reminder text messages served well to motivate the health providers and keep them engaged with the study, and presumably may have reduced underreporting.

As the FP cards were only issued to women, male-controlled contraception use is missed, including vasectomy and condom-use, particularly in the case where condoms are purchased at shops, or issued to men. Although vasectomy is rare in Malawi (0.1% of currently married women's partners[1]), condoms are widely used and so this study method underestimates condom use. However, in this population condom use is perceived as more for HIV prevention rather than contraception, so is used in a rather different way. Ever-use of condoms during the study year will be reported in future papers.

Findings on contraceptive use and dynamics are presented in other papers[155, 156]. Informal discussions with service providers have led us to believe we need to explore in

greater depth reasons for family planning switching and discontinuation behaviour.

Therefore, upon collection and analysis of the FP cards, in-depth interviews were carried out with purposely selected women who had participated in the quantitative study, to better understand these remaining issues, and these findings are presented elsewhere[157].

Acknowledgements

The Karonga DSS is supported by the Wellcome Trust. This family planning study was supported by a grant from The MEASURE Evaluation Population and Reproductive Health (PRH) project, at the University of North Carolina at Chapel Hill. ANZD was supported by The Leverhulme Trust. We wish to thank the service providers and the study participants.

Ethical approval was granted by the College of Medicine Research and Ethics Committee and the London School of Hygiene and Tropical Medicine Observational Research Ethics Committee

END OF RESEARCH PAPER

5.3 Limitations

Table 5.3 presents some of the limitations associated with the quantitative family planning card study, together with the rationale for conducting the study in this way, and strategies to address the limitations.

Table 5.3 Limitations of the quantitative study

Limitation	Rationale or strategy to address the limitation
New method for collecting FP data so there were no similar studies to imitate or learn from.	Lessons-learned with recommendations were documented.
Some KIs were elderly and found the task challenging. Therefore not all eligible women may have been reached.	KIs were monitored by KPS. KIs who struggled were matched to another KI who could support them.
Busy FP providers may have found the task challenging. Data quality problems: <ul style="list-style-type: none"> - Legibility of handwriting - Missing data - Wrong codes 	Re-training of FP providers every quarter. Air-time provided to FP providers as an incentive to participate. Reminder SMS messages sent to motivate providers.
High levels of attrition of eligible women: <ul style="list-style-type: none"> - Women not found - Refusals to accept card - Card loss/damage - Loss to follow-up - Refusals to submit card Because women who <i>did</i> submit a FP card may be different from women who <i>did not</i> , this was a potential source of bias.	Community sensitization activities aimed to reduce refusals. KPS team attempted to find missing women, in order to issue a card. 200MK incentive given to encourage women to keep card carefully. Effort made to locate women to collect FP card using DSS information on migrations.
One year of FP data collection is relatively short.	Due to funding and reporting constraints, only one year was feasible. Nevertheless it built a picture of contraceptive dynamics for short-term methods.
FP cards issued only to women. Male FP-use was missed, e.g. vasectomy or condoms.	Vasectomy rare in Malawi (0.1% of currently married women's partner[1]). Under-reporting of condom-use: <ul style="list-style-type: none"> - man gets the condoms - condom-use for STI/HIV prevention often not considered "FP"

These limitations also affect the results presented in Chapters 6 and 8, which both use data from this family planning card study.

5.4 Focus group discussions with staff involved with the study

As an informal approach to evaluating the feasibility, acceptability and practicality of the quantitative study methods, five focus group discussions (FGDs) were held with staff involved in conducting the quantitative study. The FGDs were comprised of: KPS staff; Key Informants; Clinical Officers/Medical Assistants/Nurses; Health Surveillance Assistants; and Community-Based Distribution Agents. I led in English the FGD with KPS staff involved with conducting the quantitative study, including field-interviewers from the family planning card study team, field-interviewers from the DSS team, and data entry clerks. Two qualitative interviewers led the remaining four FGDs in Tumbuka (and English in the case of the FGD with Clinical Officers/Medical Assistants/Nurses), facilitating the discussion and taking field-notes. All study participants were read an information sheet, and signed informed consent was taken. It was made clear that no individual remarks would be fed back to the participant's line-managers. This component of the qualitative work was granted approval by the LSHTM ethics committee and COMREC.

For KPS staff, the family planning card study was a very new method of collecting data. KPS interviewers are highly trained in data collection and typically are used to collecting data themselves – to a very high degree of quality. Therefore being two steps away from the data collection (working through both the Key Informants to distribute the cards, and the health care providers who recorded the data) was in some ways frustrating for KPS staff, as they felt somewhat out of control of the data collection because of having to rely on others. Similarly, data entry clerks were unaccustomed to working with data that were sometimes illegible or hard to make sense of with no opportunity of querying with the person who had recorded the data. Nevertheless KPS staff enjoyed the experience working on a new project and contributed to discussions and decision-making throughout the research process to ensure the success of the study.

This project gave Key Informants additional responsibilities, and they were paid in

recognition of this. Many Key Informants reported they would like to be involved with additional future KPS studies, should the opportunity arise. However, the project also revealed some Key Informants who struggled with the tasks and may not be in the best position to act as Key Informants for KPS for the notifying of vital events. This was communicated to the field-team involved with DSS work. There had not been a review of KIs for some time, and so this project assisted to identify some KIs who might prefer to retire from their duties.

Daily allowances and financial incentives are common in Malawi, as a way to engage health care providers in projects. Lower cadres of health care providers were disappointed not to have been compensated financially for their efforts to record data on the family planning cards (despite being provided on two occasions with significant air-time) – particularly as they knew that the women study participants had been compensated for their time – and so they were generally more negative about the responsibilities that had been placed on them. Despite this, Chapter 5 demonstrated that lower cadres of health care providers (Health Surveillance Assistants in particular) were more diligent at recording data than higher cadres. Several health care providers across different cadres commented on the heavy data reporting work-load, listing the multiple forms they were expected to fill. In contrast, other health care providers had wanted to have a greater role in the study, for example some wanted to distribute the cards instead of the Key Informants, as they felt the KIs were not in a position to undertake the task correctly. A review of the routine data that health care providers are responsible for completing might be advisable, in order to improve efficiency, utility and data quality, without burdening those recording the data. If I were to repeat this study, I would choose to financially compensate the health care providers (if budget allowed), as an additional tool to motivate them to collect the data.

The FGDs provided a forum for individuals to comment on their own views on the reasons for contraceptive changes. This process helped me to better understand the potential themes and issues for the qualitative in-depth interviews, the results of which are presented in Chapter 7. Several health care providers cited disapproving husbands, side-effects, and

challenges around access as reasons that women did not use contraception consistently. Many HSAs spoke with pride over their ability to provide quick and confidential services to women at the community-level.

One HSA suggested that the family planning card study had in fact drawn attention to contraception, and had generated discussion amongst the community, which he felt to be a positive outcome, although this does have implications for the way the data are to be interpreted, given the potential of the researcher changing behaviour of the study participants.

5.5 In-depth interviews with women about participation experiences

In-depth interviews were conducted with nineteen women as part of a separate study exploring reasons for contraceptive choices and changes, and the study methods and findings are presented in Chapter 7. These women were also asked to comment on their participation in the quantitative study, and provide feedback. Their feedback is presented here informally, as an additional evaluation of the study methods. All the women who were interviewed were happy with the study methods, particularly because of the financial compensation that was provided, which most women commented on. In a few instances, the woman's husband enquired about the family planning card. Depending on the level of communication in their relationship, the woman either explained that it was for family planning, or provided some other explanation to her husband. Confidentiality did not appear to be any more of an issue as it is with the conventional health passports and the women protected the card as carefully as they would the health passport. A handful of women did not initially have a clear understanding of the purpose of the family planning card, and presumably this is because it had not been explained by the Key Informant at the time of issuing the card.

5.6 Summary

This paper has detailed the processes undertaken to collect contraception data using innovative methods, which could be widely adopted by groups approaching the discord between contraception and fertility, or interested in contraceptive dynamics. Furthermore, this method could be adapted to other services that should be regularly delivered to or purchased by households or individuals. For example, the method could be adapted to monitor health services from the recipient's viewpoint (such as insecticide treatment for mosquito bed-nets, home-based care), or quite different services such as agricultural outreach.

Conventional assessments of contraception are not always in a position to allow analysis of contraceptive switching and discontinuation, which is an important factor for understanding the impact of contraception on fertility, and is a critical gap in understanding and delivery of contraception programmes. The paper described the data gaps, the novel methods designed to address the data gap, and presented practical experiences from the field in undertaking this kind of work. The study method was evaluated and key issues to address were presented, if repeating the work elsewhere. Informal evaluations – including discussions with women study participants, and focus group discussions with staff involved in the conducting of the study – provided some insights into successes and flaws of the method.

Chapters 6 and 8 present findings from these quantitative data, in order to explore contraceptive uptake, switching and discontinuation dynamics.

6 Paper C: Results from quantitative study

6.1 Introduction

The findings from the quantitative study are presented, building on the fieldwork methods outlined in Chapter 5. These findings paint a richer picture of contraceptive use dynamics than can be conveyed using conventional survey methods. In particular, this paper presents findings on the *actual contraceptive prevalence rate*, which is a new concept developed for this thesis, similar to the contraceptive prevalence rate, but less likely to be affected by over-reporting as it is built using provider-recorded data. The paper also presents the level of contraceptive switching, and discontinuation of short-term methods (injections and oral contraceptive pills).

Although the *actual contraceptive prevalence rate* is comparable to the conventional contraceptive prevalence rate (excluding condoms), the paper shows that there is considerable discontinuation of contraception use, and that contraception is used rather haphazardly. This inconsistent use of contraception could be a contributing factor to the continued high fertility in Malawi.

A long-abstract of this work was peer-reviewed and a previous version of this paper was presented at the International Union for the Scientific Study of Population (IUSSP) Conference in Busan, August 2013.



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AD, AC, BZ Conceived the project. AD, AC, BZ Contributed to the study design. AD, AC, RN Supervised data collection. AB cleaned and analysed the data and drafted the manuscript. All authors read, revised and approved the final article.

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6.2 "Contraceptive dynamics in northern rural Malawi: A prospective longitudinal study"

START OF RESEARCH PAPER

6.2.1 Abstract

Introduction: It remains a conundrum as to why the increased use of contraception over the past twenty years in Malawi has not translated into notably reduced fertility. This study uses an innovative method of collecting contraception data to provide insights into the dynamics of contraceptive use, and to understand the limitations of the commonly used contraceptive prevalence rate as an indicator of family planning programme performance.

Methods: A one year prospective longitudinal family planning dataset for 4,678 women was developed using provider-recorded patient-held records. Health care providers recorded details of contraceptive services provided, allowing a more accurate picture of service use.

Results: High injectable and oral contraceptive pill interruption/discontinuation was observed (only 51.2% and 27.9% of users received their next injection/pill cycle on time). Although there were clear predictive factors associated with contraception use, the ability to adhere to injectables or oral contraceptive pills was not associated with any measured variables: no group of women were able to maintain continual use of short-term methods better than any other group. Very little method-switching was observed. The *actual contraceptive prevalence rate* (35.1%) was found to be lower than conventional cross-sectional estimates.

Discussion: This study revealed very high discontinuation rates amongst all groups of women, indicating haphazard use of short-term methods. Interventions to assist women to adhere to short-term methods of contraception should be strengthened, particularly for injectable provision at the community level, as this accounted for the majority of provider-woman contacts. Promotion of long-acting methods is also recommended. Conventional assessments of the contraceptive prevalence rate are prone to overestimation, and suggestions are made for additional probes to be added to questionnaires to minimise overestimation.

6.2.2 Introduction

It is estimated that around 222 million women in developing countries would like to delay or stop childbearing but are not using any method of contraception[24]. Family planning has been relatively neglected by the international development community in recent decades[25, 26], but is now back on the agenda, with growing impetus provided by the Family Planning 2020 (FP2020) movement[27, 28]. A goal was agreed at the July 2012 London Summit on Family Planning to enable 120 million more women and girls to access modern contraceptives by 2020[27, 29].

The biannual International Conference on Family Planning in 2013 awarded international prizes for excellence in leadership for family planning[158]. Out of a total of six prizes, two went to Malawi: one to the government of Malawi, and the other to Banja La Mtsogolo (BLM, a partner of Marie Stopes International), a large private provider of contraception in Malawi. These awards celebrated progress made towards increasing access to voluntary family planning information and services.

Indeed, Malawi's recognition was richly deserved: the Malawi government has made serious attempts to address the issue of population and fertility [58, 159-162]. In terms of measurable outcomes, the proportion of women of reproductive age who are using a modern method of contraception has increased six-fold from just 7% in 1992, to 42% in 2010[1]. This is a remarkable achievement for Malawi, and is very high compared to other countries in the region. However, as with other countries in the region, fertility remains persistently high. Over the same time-period, there has been only a small decrease in the total fertility rate (TFR) from 6.7 in 1992 to 5.7 births per woman in 2010, remaining amongst the highest TFR in the region. It is a puzzle as to why the drastically increased use of contraception does not seem to translate itself into reduced fertility. For comparison it is interesting that Mozambique has a similar TFR (of 5.9) but much lower contraceptive use at 11% (2011), and that Tanzania already had attained a TFR of 5.8 in 1996 when contraception use was only 13%[163].

The “(modern) contraceptive prevalence rate” (CPR) is the term given to the proportion of women of reproductive age who report using (or who report their partner using) a (modern) method of contraception at a particular point in time. It is the most widely used measure of success of contraception programmes. The CPR is a tracking indicator for Millennium Development Goal 5 target 5B to “achieve universal access to reproductive health by 2015”[30], and it is the first of 15 indicators that 69 countries will annually report for FP2020[27]. It is also commonly used in other evaluations of trends and comparisons. The CPR is normally captured in surveys such as the Demographic and Health Surveys (DHS), Multiple Indicator Cluster Survey (MICS), and other large-scale national surveys. Typically, the question asked is: “Are you currently doing something or using any method to delay or avoid getting pregnant?”. If the reply is “Yes” the woman is asked what method she is using, (and non-modern methods are excluded for calculation of the modern CPR).

Contraception is a determinant of fertility[31], but there are other factors involved. Potential explanations for the Malawi paradox of high fertility despite increased contraceptive use include: a) whereas CPR is estimated cross-sectionally the DHS uses births from the past five years to calculate TFR so any increase in CPR might only be reflected in the TFR indicator a few years later; b) an ecological fallacy, where contraception might be more commonly used by those at low risk of pregnancy (e.g. older women, or those experiencing postpartum amenorrhea) or those who otherwise were ensuring low family size, and non-users contribute a disproportionately high number of births; c) other proximate determinants of fertility may dominate, e.g. short breast-feeding periods, early age of sexual debut and marriage (median age of first marriage in Malawi is 19); d) over-reporting of either fertility or contraception. There are several possible reasons for over-reporting of contraception. A woman might consider herself to be a contraceptive user and respond positively that she is using contraception, even if she is in reality late for a repeat appointment for e.g. injections or pills, and so technically is not a current user. There might be something different about provision of contraception services in Malawi (perhaps more common stock-outs), that means women are more likely to miss repeat appointments and

over-report their contraception use. Alternatively, Malawian women may have learned what is the desirable response, as a result of media campaigns and multiple provider-initiated family planning conversations.

One way of assessing the validity and reliability of contraception data is to compare linked husband and wife reports, and identify any discrepancies [33, 34]. Typically, husbands report higher levels of contraceptive use than their wives[34]. A finding from Malawi suggests that when couples disagree on a range of issues in surveys (e.g. on household items, livestock, children and family planning), it is typically the husband who responds “yes” and the wife who responds “no”[35]. Another study found relatively good agreement over contraception use among monogamous couples, but discrepancies in polygamous unions[36]. It is possible that both under and over-reporting are occurring, and in the Malawi context it could be that over-reporting is more common. According to the Malawi DHS, only 5% of contraceptive users have not told their husband they are using contraception. That suggests the users may be less likely to deflate their reported contraception-use to an independent interviewer.

Another explanation could be inconsistent use of contraception. In their seminal paper, Curtis and Blanc argue that it is important to examine contraceptive dynamics such as switching and discontinuation because as desired family size declines and contraceptive prevalence increases, effectiveness and duration of use become increasingly significant determinants of total fertility, unintended pregnancies and induced abortions[84]. In this paper, “consistent” use of contraception refers to adequate continuous contraceptive use with no breaks. It can include method-switching as long as there is no gap in use.

Data on family planning (FP) come from a variety of sources such as routine data collected at health facilities, and retrospective surveys, for which the Demographic and Health Survey (DHS) has developed tools such as the calendar method. Contraceptive calendars capture a woman’s retrospective self-reported contraceptive status and method every calendar month for the five years prior to interview. However, retrospective contraceptive calendars are prone to selection bias (as only those surviving to interview can

report), and memory recall issues. It is difficult for many women to recall their contraceptive use from long-ago. With the exception of the calendar method, assessments of contraception do not attempt to capture switching or discontinuation. Using 2004 Demographic and Health Survey (DHS) data, Ali and colleagues used calendar data and found high contraceptive discontinuation rates in Malawi[89]. They also found that out of a comparison of 17 countries, Malawi had the lowest proportion of women who reported they switched to a modern method of contraception within three months of method-related discontinuation, suggesting poor switching behaviour in the context of discontinuation[89].

The Karonga Prevention Study (KPS) operates a health and demographic surveillance site (DSS) in northern rural Malawi (figure 1), with 36,524 individuals in 8,076 households under observation at the end of 2012[45]. Recent DSS studies have focused on adult HIV, sexual and reproductive behaviour and on fertility intentions[36, 76, 142, 150]. Using cross-sectional data from 2008-2009, KPS estimated the contraceptive prevalence rate at 45%[36], which is consistent with the DHS CPR for Karonga district, at 45% in 2010[1]. A range of contraception methods are provided in the DSS area through different mechanisms: government, Christian Health Association of Malawi (CHAM), private (e.g. BLM) facilities[52, 62], as well as at the community level (e.g. outreach posts or provider's or recipients homes). There are also a range of cadres among service providers: Clinical Officers, Nurses, Medical Assistants, Health Surveillance Assistants (HSAs, some of whom are trained to provide 3-monthly Depo Provera injectables in the community), and volunteer Community Based Distribution Agents (CBDAs who provide two-cycles of oral contraceptive pills (OCP) at a time, and condoms)[53, 54, 61].

We conducted an innovative prospective study which used an alternative method for collecting contraception data, with patient-held records capturing provider data to build a longitudinal dataset allowing exploration of continuity of use and provider/method-switching, and which allows individual records to be linked to the KPS DSS.

6.2.3 Methods

Data collection

Family planning (FP) cards were offered to all women aged 15-49 living in the DSS (7,393) between January-April 2012. In order to distribute the cards rapidly, KPS field-workers trained 278 local key informants (who inform KPS monthly of all births and deaths in the DSS) to issue the cards, using listings of all eligible women. The card was attached to the woman's health passport (patient-held medical record), and the woman was asked to keep her card carefully for one year.

All 132 health care providers (of all cadres, and including CHAM and BLM providers) working in the study catchment area were trained to record information on the FP cards, whenever they provided contraception to a woman who was holding a card. Multiple refresher trainings were conducted, mobile phone air-time was provided to all providers, and motivational text messages were periodically sent to all health care providers, as a way to encourage them to continue recording data on the cards. The task was also incorporated as part of their record-keeping responsibilities, by the District Family Planning Coordinator.

After one year, the FP cards were collected from the women (February-May 2013), by the KPS field-team, and any missing family planning episodes were completed on the card by the KPS field-team, by checking other entries in her health passport to see if any events were documented there that were not recorded on the FP card. The woman herself was also asked to report on her family planning use over the previous year. Using this method, the majority of the data were collected in a prospective format (as per the health care provider written reports), but gaps in data were filled in using a retrospective method (reported by the woman), aiming for a more complete and accurate dataset than is possible using conventional methods. In the event that a woman had previously had a tubal ligation, implant or IUD prior to receiving the FP card, this was duly recorded as an explanation for the fact that her FP card would be blank.

Data management and analysis approach

The new family planning data were linked to the existing KPS database, and Stata 12 was used to analyse the data. Age - from the DSS - was calculated as at the time of receiving the FP card. The highest attained education level was calculated, as reported in previous KPS socio-economic surveys. HIV status had been collected as part of previous KPS studies, using door-to-door HIV testing with rapid tests. Women were assumed to be negative if she had a negative test up to four years before receiving the FP card, and positive if she had a positive HIV test any time before receiving the FP card. For all other women, her HIV status was considered unknown. For other time-varying covariates (marital status & fertility intention, both collected as part of an adult sexual behaviour survey 2010-2011), the most recent observation at the date that the woman received her FP card was used, and in the case that a woman did not have an observation within two years of her receiving the card, these variables were considered missing. For marital status and fertility intentions, 85% and 45% respectively of the observations had been recorded within one year of the date the woman received the card. As GPS coordinates are available for all residents (including resident health care workers) in the DSS, it was possible to calculate the distance of women's residence to: a) the closest road and; b) the closest provider of family planning (health facility, or HSA, CBDA at the community level).

The new data collection method correctly identified all the women who had reported in three previous KPS surveys that they had a tubal ligation. In the event that the supply date of contraceptive services was not reported, this was imputed based on knowledge of supply dates of other services the woman received, and the date she received and submitted her card.

Reports of ever-use of condoms (during the study-year) were collected at the final interview, but no systematic attempt was made to get dates of condom purchase or free provision. Condoms are generally considered to be for HIV prevention rather than

contraception but are often used for dual protection. They may be obtained by the woman's partner, which would not be recorded on the FP card, and may be used later rather than at the time of purchase. Moreover, they tend to be used inconsistently[157], to a different extent with different partners, or sporadically, depending on the presence of other sexually transmitted infections. Therefore event-history analyses of condoms are not conducted. Information on ever-use of traditional methods (in this context withdrawal or calendar method) was also collected, based on women's reports upon collection of the FP card, but was not subject to event-history analysis.

An *actual contraceptive prevalence rate* was calculated at multiple time points after a woman received the FP card. The *actual CPR* (a new term developed for this paper) is a more accurate reflection of the CPR and takes into account discontinuation and gaps in use. The level of method-switching was observed, and event-history analysis was used to explore contraceptive discontinuation.

Ethical consideration

Ethics approval for the study was granted by the College of Medicine Research and Ethics Committee, Malawi, and the ethics committee at the London School of Hygiene and Tropical Medicine, UK. Informed written consent for the collection and analysis of data was taken from the study participants upon collection of the family planning cards. More detailed methods and an evaluation of the success of the data collection are described elsewhere[164].

6.2.4 Results

Descriptive findings

Of 7,393 eligible women, 6,861 (92.8%) were issued with a FP card and 4,678 (63.3%) submitted their FP card at the end of the study year. The average length of observation time was 383 days (s.d. 38, range 122-519). The profile of all eligible women is presented in Table 6.1. Non-participants were slightly younger, never married, and more educated[164]. 43% of study participants used a modern method of contraception at some point during the study (excluding condoms). The profile of contraceptive users was compared to the profile of non-users. Only 9.0% of never married women used contraception compared to 36.1% of separated/widowed/divorced women and 50.7% of married women. Contraceptive users were more likely to be married, older, higher parity, and want no more children than women who did not use contraception.

Table 6.1 Profile of all eligible women, and a comparison of contraceptive versus non-contraceptive users, N (%) in each category

	All eligible women		Did use contraception		Did not use contraception ^a		Total Participants		χ^2 test ^b
Mean age	29.0		31.6		29.5		30.4		p<0.001 ^c
	N	%	N	%	N	%	N	%	
Marital status									p<0.001
Currently married	4,923	66.9	1,706	50.7	1,661	49.3	3,367	100	
Separated/ widowed/ divorced	993	13.5	219	36.1	388	63.9	607	100	
Never married	1,446	19.6	56	9.0	563	91.0	619	100	
Total	7,362	100	1,981	43.1	2,612	56.9	4,593	100	
Proximity to road									p=0.005
<1km	3,537	47.9	926	45.4	1,113	54.6	2,039	100	
>1km	3,851	52.1	1,058	41.3	1,505	58.7	2,563	100	
Total	7,388	100	1,984	43.1	2,618	56.9	4,602	100	
Proximity to provider of family planning									p<0.001
Less than 0.5km	2,889	39.1	846	46.6	971	53.4	1,817	100	
0.5-1.5km	4,044	54.7	1,034	41.6	1,449	58.4	2,483	100	
More than 1.5km	455	6.2	107	36.3	188	63.7	295	100	
Total	7,388	100.0	1,987	43.2	2,608	56.8	4,595	100	
Education									p=0.004
Incomplete primary	548	7.4	124	35.3	226	64.6	350	100	
Complete primary	4,203	57.0	1,256	44.5	1,569	55.5	2,825	100	
Secondary+	2,628	35.6	603	42.4	820	57.6	1,423	100	
Total	7,379	100	1,983	43.1	2,615	56.9	4,598	100	
HIV status									p=0.245
HIV positive	572	8.9	154	42.2	211	57.8	365	100	
HIV negative	5,824	91.1	1,683	45.4	2,027	54.6	3,710	100	
Total	6,396	100	1,837	45.1	2,238	54.9	4,075	100	
Parity									p=0.001
None	183	3.4	46	45.1	56	54.9	102	100	
1-4	3,328	61.5	1,031	46.8	1,172	53.2	2,203	100	
5+	1,905	35.2	767	53.2	675	46.8	1,442	100	
Total	5,416	100	1,844	49.2	1,903	50.8	3,747	100	
Fertility intention									p<0.001
No more	2,110	42.1	816	53.1	721	46.9	1,537	100	
Wait 2+ years	1,896	37.8	533	44.6	662	55.4	1,195	100	
Want within 2 years	638	12.7	128	29.9	300	70.1	428	100	
Unsure	369	7.4	48	23.9	153	76.1	201	100	
Total	5,013	100	1,525	45.4	1,836	54.6	3,361	100	

^a Including male/female condoms and traditional methods

^b Testing the difference between did use contraception and did not use contraception

^c Two-sample t test, testing difference between means

Methods that require repeat visits accounted for the most provider-client contacts with delivery of injectables (Depo Provera) claiming the majority at 79% (Table 6.2). Tubal ligations, implants and IUDs carried out prior to the study are not reported in this table. HSAs, nurses and CBDAs were responsible for most service provisions (2067, 520 and 344 respectively). Although a notable proportion of services were provided at government (37%), CHAM (3%), or NGO/private facilities (1%), a large proportion of services were

also provided outside of these facilities, including at outreach posts (14%), the provider's home (37%), or the woman's home (7%).

Table 6.2 Provider-client contacts: Contraceptive methods, provider cadre, and location that the contraceptive service was provided

	Number ^a	Per cent
Method of contraception		
Tubal ligation	56	1.7
Implant	184	5.6
IUD	1	0.0
Injection	2,592	79.0
Oral contraceptive pills	439	13.4
Removal of implants/IUDs	9	0.3
Total	3,281	100
Type of health care provider		
Clinical Officer	162	5.2
Medical Assistant	43	1.4
Nurse	520	16.6
HSA	2,067	65.8
CBDA	344	11.0
YCBDA	6	0.2
Total	3,142	100
Location that contraceptive service was provided		
Government	1,206	37.1
CHAM	110	3.4
NGO/Private	47	1.4
Outreach	459	14.1
Provider's home	1,196	36.8
Woman's home	227	7.0
Other	6	0.2
Total	3,251	100

^a Excluding male/female condoms and traditional methods

The Actual Contraceptive Prevalence Rate

The *actual contraceptive prevalence rate* is the proportion of women currently using a modern method of contraception, as per provider-recorded data. It was estimated at multiple time points after a woman received the FP card, as a check for the consistency of *actual CPR*, for married women and all women. Retrospective verbal reports of injectables and OCP were excluded as they are prone to over-reporting. The *actual CPR* increases slightly over time, as the months since receiving the FP card increases, suggesting some of the early injectable provisions may have been missed (as the study was being rolled out).

According to manufacturers guidelines, the 3-month Depo Provera injectable must be repeated within 13 weeks. However, according to WHO guidelines, if the woman has not yet menstruated then it is acceptable to give her the follow-up injection up to 17 weeks.

Therefore, the *actual CPR* was calculated with differing assumptions for how long the injectable lasts. For example, at seven months the *actual CPR* for married women increases from 35.1% (injection lasts for 13 weeks), to 36.9% (17 weeks), to 37.8% (allowing the injection to last for 21 weeks, which is well beyond WHO recommendations) (Table 6.3).

This demonstrates the impact on the CPR of different assumptions for how long an injection lasts, and shows that if women are late for their follow-up injection (and technically no longer a contraception user) and yet continue to consider themselves to be FP users and report themselves as such, an overestimation of CPR may occur.

Table 6.3 The *Actual Contraceptive Prevalence Rate** (Proportion of women currently using a modern method of contraception, as per provider-recorded data), 2012-2013

Number of months	Assume injectables lasts for 13 weeks		Assume injectables last for 17 weeks		Assume injectables last for 21 weeks	
	CPR married women	CPR all women	CPR married women	CPR all women	CPR married women	CPR all women
5	33.4	28.0	35.0	29.3	36.0	30.2
7	35.1	29.5	36.9	30.9	37.8	31.7
9	35.6	30.5	37.2	31.8	38.4	32.7

*Excludes male/female condoms

The *actual CPR* and method-mix using the new family planning card data (35.1% at seven months, assuming injections last for 13 weeks) was compared to KPS cross-sectional CPR data (from a sexual behaviour population survey in 2010-2011) and DHS cross-sectional CPR data (national level and Karonga district), for currently married women (Table 6.4). The new family planning data observes noticeably lower injectables, suggesting that cross-sectional data have a tendency to overestimate use of injectables. The new data also observes higher implants, but this may be a result of the new data being collected in 2012-2013, after a general implant promotion in Malawi. The new data did not capture vasectomy/condom use, and so the *actual CPR* should be compared to “CPR-condoms-

vasectomies”, although vasectomies are extremely rare in Malawi and condoms are likely to be overestimated in cross-sectional estimates, due to inconsistent use.

Table 6.4 Method-mix: Per cent distribution of currently married women age 15-49 by contraceptive method currently used

Method	KPS estimate of actual CPR, 2012-2013 ^a	KPS cross-sectional estimate, 2010-2011 ^b	DHS Karonga, 2010 ^c	DHS national, 2010 ^c
Tubal ligation	12.8	10.5	12.1	9.7
Vasectomy	-	0.0	0.0	0.1
Implant	6.8	2.9	3.2	1.3
IUD	0.3		0.0	0.3
Injectables	14.1	21.1	19.9	25.8
OCP	1.2	1.7	1.3	2.5
Condoms	-	10.0	8.8	2.5
Total (CPR)	35.1	46.2	45.4	42.2

^a At seven months since receiving the card, assuming injections last for 13 weeks

^b Karonga Prevention Study cross-sectional estimate from 3rd round of a population survey

^c Demographic and Health Survey – 2010

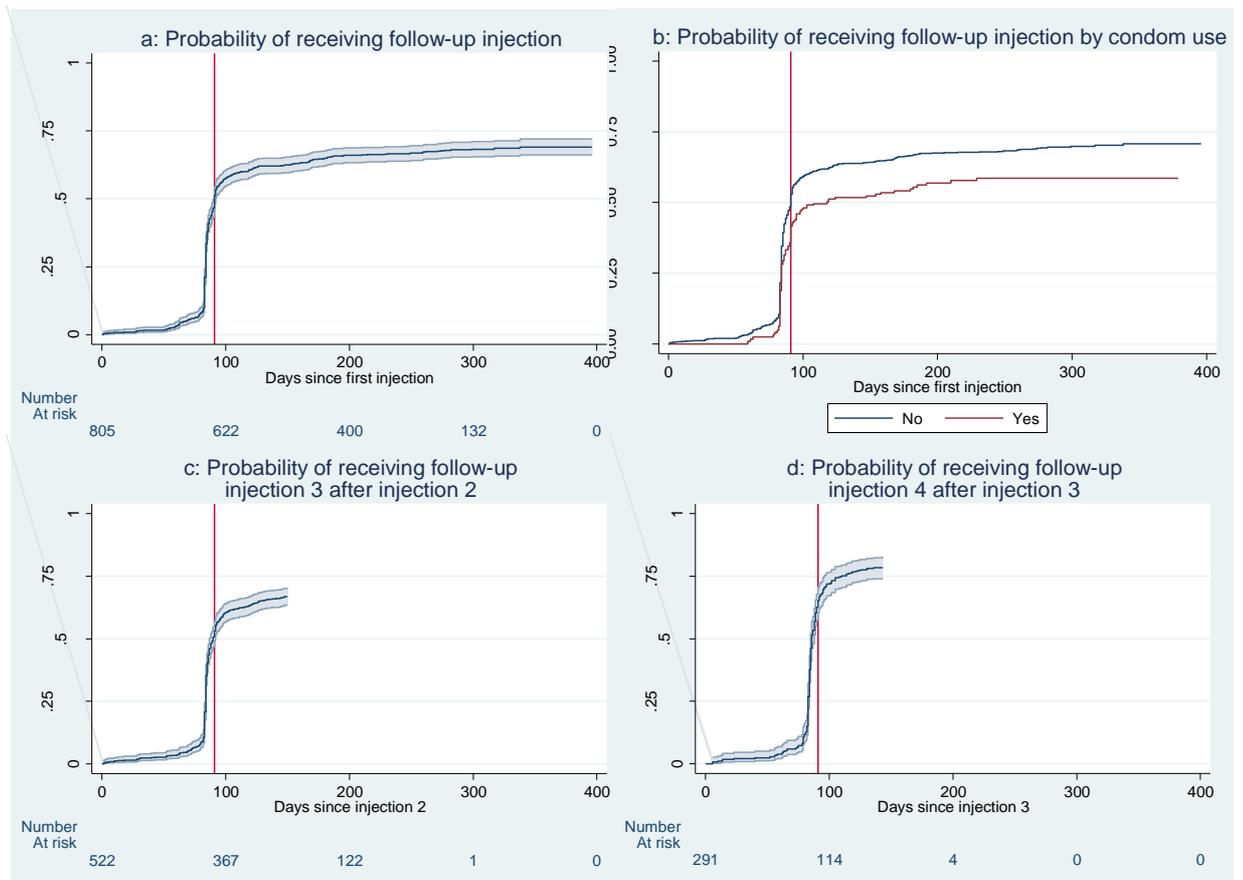
Injectables discontinuation

Because of the high dependence on 3-month injectables for contraception, adherence to injectables was examined. Survival analysis was used to explore time from the first observed injection to the second (Figure 6.1a). Just 51.2% had their follow-up injection within 13 weeks (91 days, the time by which WHO guidelines state the next injection must be administered), and by the end of the year, only 69.1% had a follow-up injection.

Excluding imputed dates did not significantly affect the results. 6.5% of women had their second injection within 11 weeks which is technically too early, is a waste of injectables resources, and over-dosing potentially increases side-effects. Neither age, parity, education, proximity to road, proximity to a health care provider, fertility intentions, marital status nor HIV status were significant predictors of uptake of second injection on schedule. The one exception was condom use: women who reported condom use over the study year were less likely to uptake their follow-up injection in time. This may be a case of reverse causality, possibly because these women used condoms for contraception when they could not get the injection on time (Figure 6.1b).

The probability of receiving the third injection after the second, and the fourth injection after the third (53.1% and 65.4% by 91 days, respectively), are presented in Figure 6.1c and Figure 6.1d). The proportion having a subsequent injection on time improves as more injections accumulate, presumably because the women who persevere with this method are a selected group of dedicated users. Of all women who had at least one injection, survival analysis estimated that only 15.1% managed to adhere to the injection schedule for a whole year with no gaps between injections longer than 91 days, demonstrating very high discontinuation.

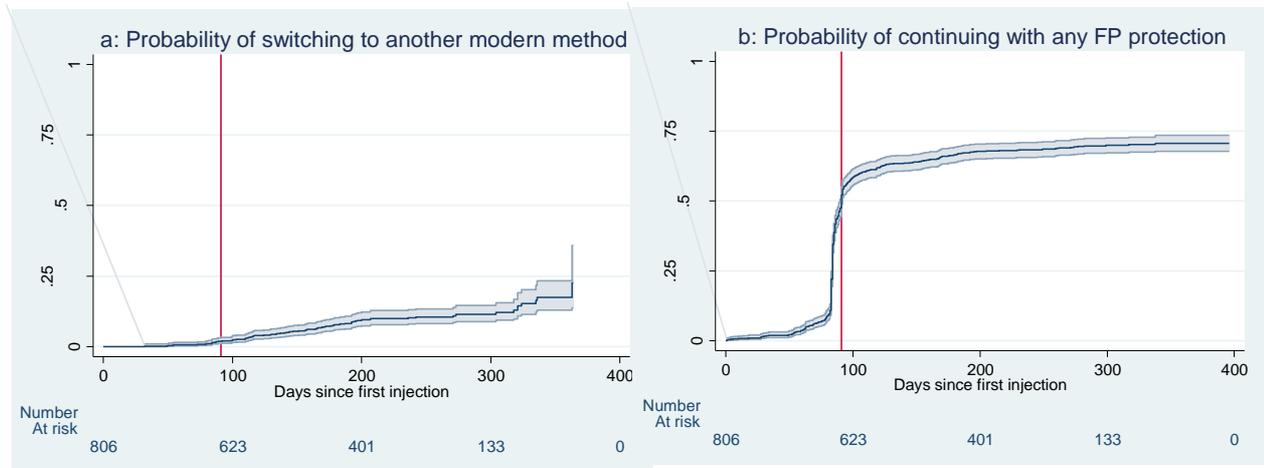
Figure 6.1 Probability of receiving next injection (a, b, c, d)



*Red lines indicate 91 days, the time by which WHO guidelines state the next injection must be administered

The probability of switching to another (non-condom) method is very low (Figure 6.2a). The probability of either continuing with injections or switching to another method (i.e. adhering to any method except condoms) is presented in Figure 6.2b: 52.1% by 13 weeks, and 70.7% by one year.

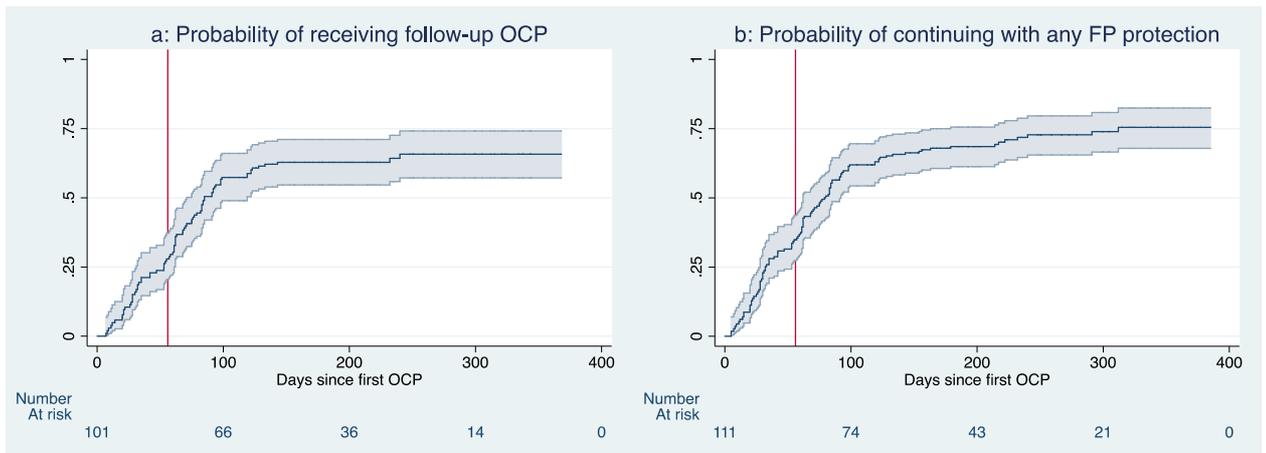
Figure 6.2 Probability of a: switching to another method, or b: continuing with any method



OCP Discontinuation

Typically, two cycles (56 days) of pills are provided to women at each contact. It is important to note that whereas injectables may offer some protection beyond 13 weeks, this is not the case with OCP – once a woman has run out of pills, she has no protection. By 56 days, only 27.9% of women who initially received OCP had received her follow-up pills (Figure 6.3a). No predictive factors associated with OCP discontinuation were identified, although this may in part be due to the smaller sample size (fewer women use OCP), and confidence intervals were wide. There was slightly more switching from OCP to other methods. At 56 days, the proportion of women who either continued with OCP or made a switch to another modern method (excluding condoms) was 34.9% (Figure 6.3b), suggesting poor continual use of contraception.

Figure 6.3 Probability of a: receiving follow-up OCP, or b: continuing with any method



Red lines indicate 56 days, as typically two cycles of OCP (each of 28 pills) are provided to women at each contact

Method switching

Excluding condoms, the maximum number of different methods that a woman used over the study period was two, even by women who were seen many times. Just 84 (4.2%) contraception users switched methods. Apart from age (switchers were younger because older women tend to use long-acting methods, which give less opportunity or reason for switching) and fertility intention (women who want no more children were less likely to switch methods, again because they were more likely to use permanent methods), marital status, education, and parity were not associated with method-switching. Of contraception users who used just one method, 14.6% also reported condom use, as compared to 10.7% of method-switchers, but this difference did not reach statistical significance. Of women who did not use modern contraception, 28% reported condom-use and 19% reported using traditional methods.

Table 6.5 presents ever-use of contraceptive methods by the first method that was observed through this study. For example, the 49 women who were initially observed when they had a tubal ligation, the only method that was used was tubal ligation, which is unsurprising given it is a permanent method. Of the 147 women whose first observed

method was an implant, 3 (2%) later used injections, whereas 98% used the implant exclusively.

An index of changeability is presented in the final row, indicating the average number of methods a woman used. This index denotes women who stopped the initial method and switched to another method. It is calculated as follows: the total number of methods used by all women first observed using a specified method is divided by the total number of women first observed using the specified method. For women who were first observed to use oral contraceptive pills (OCP), the average number of methods used was 1.18, showing that there was a notable rate of switching, predominantly to injectables. There was relatively low switching for women who were initially using injections (1.05, those who did switch changed to implants and OCP) and implants (1.02, those who did switch, changed to injectables).

Table 6.5 Method-switching

	First method used				
	Tubal ligation	Implant	IUD	Injections	OCP
Total women starting method	49	147	1	956	125
Total number (%) using exclusively	49 (100%)	144 (98%)	1 (100%)	906 (95%)	103 (82%)
Ever-use of other methods					
Tubal ligation	-	0 (0%)	0 (0%)	1 (0%)	1 (1%)
Implant	0 (0%)	-	0 (0%)	30 (3%)	4 (3%)
IUD	0 (0%)	0 (0%)	-	0 (0%)	0 (0%)
Injectables	0 (0%)	3 (2%)	0 (0%)	-	18 (14%)
OCP	0 (0%)	0 (0%)	0 (0%)	19 (2%)	-
Total number of methods reported	49	150	1	1006	148
Index of changeability^a	1.00	1.02	1.00	1.05	1.18

^a Index of changeability is the average number of methods a woman used. It is the ratio of the total number of methods by total number of women

6.2.5 Discussion

The prospective longitudinal dataset that was generated by patient-held records offered a unique insight into contraceptive dynamics amongst a community of women of reproductive age living in a DSS. Key findings revealed very high discontinuation rates of injections and OCP (only 51.2% of injection users and 27.9% of OCP users had their follow-up on time), indicating irregular use of short-term methods leaving women exposed to pregnancy.

There were a number of factors associated with ever-use of contraception over the study year. Women who used contraception were: older; currently married; lived close to a road; lived close to a provider of family planning; had achieved more education; had more children; and wanted no more children. However, no factors were associated with continuity of use, although condom users were more likely to discontinue, presumably because they may have switched to condoms. This was an important finding as it demonstrated that no one group of women was any better able to adhere to short-term contraception than any other group. The implications of this are that interventions to assist women to continuously use contraception do not need to be targeted at specific sub-groups. All women should be targeted with interventions to assist them to adhere to short-term methods of contraception. Ali and Cleland also found that education had little effect on discontinuation, although it had an effect on switching[87].

Injections accounted for the vast majority of provider-woman contacts (79.0%). They were largely provided as outreach services (either at outreach clinics or at the provider/woman's home), by low cadre health care providers. This demonstrates the importance of community-based distribution of short-term methods of contraception by well-trained lower cadres of staff. Strategies to improve this model (community-based injectable provision by lower cadres) should be explored, to assist women to use contraception continuously without gaps. The skewed method mix in favour of injectables and tubal ligations for women who have completed their family size might reflect cultural

preferences and social norms. But it is problematic if it is due to lack of access to alternative methods or provider-bias[165], which may partially be the case in rural Malawi. For women who wish to delay childbearing, it would be prudent to counsel on the full range of long-acting methods including implants and IUDs, in order to help them to identify a method most suited to them, avoid inconsistent use of short-term methods, and ultimately prevent unintended pregnancies[143]. We observed very few implant removals, as implants were only just being scaled up at the time of the study. However, we learned anecdotally at the time of writing that many women were recently requesting implants to be removed as a result of a rumour that had been circulating about implants causing cancer.

The *actual CPR* was calculated (35.1%) and shown to be slightly lower than cross-sectional estimates of the CPR, assuming that injections only last for 13 weeks. It was therefore demonstrated how conventional estimates of CPR may be prone to over-estimation if a woman considers herself to be a contraception user even if she is late for her repeat appointment for short-term methods. Allowing for the fact that the sample of study participants was slightly older and more likely to be married than the eligible population (these groups are more likely to be contraception users), this suggests the *actual CPR* presented here may even be an overestimate of the population *actual CPR*.

This has implications for how conventional CPR estimates are interpreted, and how to quantify the size of the over-estimate. We suggest probes must be added to conventional cross-sectional enquires to ascertain whether the woman is continuously using the method, and whether she is currently protected. For example, in addition to the existing question “Since what month and year have you been using (current method) without stopping?”, we suggest adding for injections: “When was the last time you had your injection?” to cross-check whether it was within the last three months.

It is difficult to interpret reports of condom use with this dataset. We were unable to record the timing or consistency of condom use, although we were able to record ever-use of condoms over the study year. Our *actual CPR* is much lower than cross-sectional estimates of CPR when condoms are included in the CPR. However, when our *actual CPR* is

compared to the “CPR-condoms”, they are more similar. We strongly suspect that effective condom-use is also overestimated in cross-sectional surveys. Of women who reported themselves to be condom-users in a past KPS 2008-9 cross-sectional survey, only 36.4% reported always using condoms with their husbands in a later section of the survey. The majority of women reported only “mostly” or “sometimes” using condoms. Qualitative findings also revealed how inconsistently condoms are used[157]. We therefore suspect the cross-sectional estimate of condom use in Karonga to be an over-estimate in terms of consistent protection against pregnancy, and again recommend additional probes to be added to questionnaires for cross-sectional estimates. For example, we suggest adding “Did you use a condom at last sex?” or “How often do you use a condom during sex?”, as a cross-check for whether condoms are being used consistently, and so condom-use can be corrected.

Little method-switching was observed, although this may have been a result of the relatively short follow-up time (one year). However, Ali and colleagues showed that women who do not switch within three months of discontinuation are unlikely to switch thereafter[89]. They also showed that fewer women in Malawi than any other country they studied have switched to another method within three months of stopping. Our findings of low method-switching therefore supports Ali et al.’s findings.

There were limitations to the study methods. Unmarried and young women were under-represented in this study and the attrition was 36.3%, so the study population may have differed in some ways from the general population. Furthermore the method of data collection relied on busy non-research health providers and so there was potential of mis-reporting and under-reporting. However, this was minimized by cross-checking with the health passport paper record, and asking the woman to report retrospectively on her contraception use upon collection of the FP card. Although the study took place in a small area of rural northern Malawi, we believe the findings are likely to be generalizable to other parts of Malawi and the sub-Saharan African region, as the challenges around contraceptive use, discontinuation, and persistently high fertility are likely to be similar.

Acknowledgements

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END OF RESEARCH PAPER

6.3 An additional comment on condom-use

Condom-use complicates our understanding of current use of contraception. Excluding condoms, the *actual CPR* (35.1%) was not too dissimilar to the conventional measure of the CPR (36.2% from the KPS multi-round sexual behaviour survey, and 36.6% according to the DHS). When condoms are included, the *actual CPR* (35.1%) is significantly lower than conventional estimates (46.2% from the KPS multi-round sexual behaviour survey, and 45.4% according to the DHS). It is likely that condom-use is overestimated in surveys.

Condom-use amongst married Malawian women is relatively low (2.5% report currently using condoms as a method of contraception in the DHS). However it is considerably higher in Karonga District (8.8% for comparison) and the neighbouring district Chitipa (11.1%) according to cross-sectional DHS data[1]. The sample sizes for the two districts were relatively small (184 in Chitipa, 297 in Karonga). It is unclear whether condoms are genuinely more commonly used in these northern districts, or whether this is an artefact of the data collection. The DHS Tumbuka questionnaire (that was more commonly used in Karonga and Chitipa) was compared with the Chichewa and English questionnaire to check for translation drift for the question “Are you currently doing something or using any method to delay or avoid getting pregnant?”. No difference in the translations were found.

It was not possible to compare condom-use by district between the 2010 and the 2004 DHS estimates in order to explore whether the high condom-use seen in Karonga was also observed in the previous DHS survey. The sampling frame for the 2004 survey was stratified by ten large areas and Karonga was combined with four other districts in the northern region, so it was not possible to provide an estimate of condom-use by district in 2004. However, condom use by region was compared between 2004 and 2010 (Table 6.6). There was little change in condom use (from 5.9% in 2004 to 5.6% in 2010). Condom-use appears to be higher in the northern region compared to central and southern regions in both surveys.

Table 6.6 Condom use by region, using 2004 and 2010 DHS data

Current use of condoms	Northern	Central	Southern	Total (N)
2004	5.9%	1.3%	0.9%	1.7% (203)
2010	5.6%	1.4%	1.8%	2.1% (1,465)

However, the multi-round sexual behaviour survey conducted by KPS in 2008-2011 revealed that of the 10% of women who reported themselves as condom-users, only 36% reported *always* using condoms in a later section of the questionnaire. The remainder reported mostly (25%), sometimes (31%) or never (7% - a reporting contradiction) using condoms. Therefore, although 10% self-reported themselves as condom users, on further probing only 3.6% of women were *effectively* using condoms, i.e. using them consistently. Some condom-use may be for HIV/sexually transmitted infection (STI) prevention. In the situation of concurrent sexual partners, condoms may be used with one partner and not another. These factors additionally complicate our understanding of condom-use.

When conducting interviews on condom-use, it would be prudent to include probes on frequency and selectivity of use at the time of asking contraception questions (rather than later on in the questionnaire), so as to interpret reports of current condom use. The high proportion of women who report using condoms in Karonga district may not be giving a true impression of the consistency of condom-use.

6.4 Summary

This paper has demonstrated that short-term methods of contraception are used inconsistently in the study area. The estimation of the *actual contraceptive prevalence rate* is slightly lower than the conventional contraceptive prevalence rate, suggesting that conventional estimates could be at risk of overestimating the CPR, which could be a contributing explanation for the high fertility seen in Malawi, despite apparently high contraceptive use.

7 Paper D: Results from qualitative study

7.1 Introduction

In order to shed light on the results presented in Chapter 6, and better understand the reasons for contraceptive switching and discontinuation, a qualitative study was conducted. In-depth interviews were carried out with nineteen women who had all participated in the quantitative study. The women were asked to comment on their motives for starting, stopping, and switching methods of contraception. Interview guidelines and other materials for the qualitative study are presented in Appendix B. This paper will be submitted for peer-review after the PhD.



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AD, BZ, SM contributed to study design. AD, DM, AC supervised data collection. AD analysed the data and drafted the manuscript. All authors read, revised and approved the final article.

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Basia Zaba

7.2 “Inconsistent contraceptive use in northern Malawi: Perceptions and expectations of rural women”

START OF RESEARCH PAPER

7.2.1 Abstract

Background: Contraceptive switching and discontinuation are important to understand, as high rates of either suggest dissatisfaction with methods, and discontinuation leaves women at risk of unintended pregnancies. High rates of discontinuation, and little switching have been observed in northern rural Malawi. Although there has been interest in facilitating factors and barriers to contraceptive use, less research has focused on reasons for contraceptive switching and discontinuation.

Methods: Nineteen in-depth interviews with Tumbuka-speaking women in rural northern Malawi were conducted. Study participants included non-users, method-switchers, discontinuers, and consistent contraceptive users. Women were asked to provide a narrative of their contraceptive use and the motivating factors for switching, stopping, and gaps in use were explored. Thematic content and framework approaches influenced analysis.

Results: Despite injection-users identifying as contraceptive users, upon further probing it emerged that many women were not using this method consistently. Changes in menstruation were interpreted as indicating changes in fertility. The context of high fertility norms and child-rearing support from others created an environment where couples were less motivated to use contraception consistently. Misconceptions and fear of potential side-effects were more powerful than experienced side-effects at encouraging inconsistent use. Supportive husbands encouraged switching for women experiencing side-effects, whereas a husband’s disapproval either led to discontinuation, switching to a less visible method or clandestine use of family planning services.

Discussion: Self-identifying as a contraceptive user despite improper use of the method, was a new finding. A fatalistic approach, and inability to accept being at risk of pregnancy contributed to this, even though most women had a clear understanding of method-action and the instructions to present for repeat appointments. High fertility norms in this community meant that concern over loss of fertility from injectables was difficult to tolerate. Strategies that encourage couples to *want* smaller families and motivate women and men to commit to contraceptive use are recommended.

7.2.2 Background

Contraceptive switching and discontinuation is an important area to understand, as high rates of either tend to suggest dissatisfaction with methods. High rates of discontinuation may also be a result of poor provision of services. As contraceptive use increases and desired family size decreases, continuity of use becomes a more important determinant of unintended pregnancies, abortions, and ultimately fertility[84, 89, 93]. Nationally representative surveys showed that over 25% of Malawian women who discontinued contraception due to dissatisfaction with the method had a mistimed or unwanted birth within 12 months of discontinuation[89].

Although there has been considerable interest in exploring reasons for use or non-use of contraception, less research has focused on reasons for contraceptive switching or discontinuation. The few studies that have focused on contraceptive dynamics tend to use quantitative data from cross-country comparative reports to describe rates of discontinuation classified by method-related reasons[85-91], which imply dissatisfaction or problems with the method rather than desire for pregnancy or because of no further need. Method-related reasons are particularly important to understand, because they affect women who stop using contraception despite having a need.

Reasons for switching or stopping contraception are likely to be similar to reasons that influence initial method choice. However, they are more likely to be based on actual experiences. Characteristics that make some women more likely to switch or discontinue family planning include age, parity, education, and partner's desired fertility. The local contraceptive prevalence rate also acts as a community-level influence [85, 90]. Side-effects are a common reason for discontinuing contraception, particularly hormonal methods that cause changes in menstruation[85, 95, 96]. Partner disapproval, and practical issues around convenience, access, cost, availability and confidentiality were also found to contribute somewhat to discontinuation, although these were relatively rare compared to side-effects and health concerns[85, 95-97]. Interference with sexual pleasure was a commonly cited

reason for discontinuation of condoms, and some discontinuers of condoms/pills reported a desire for a more effective method[96].

Although good quality counselling on expected side-effects is thought to be important for maintaining contraceptive use, improvements in service-provision are unlikely to encourage women to continue using a method, if they are inherently dissatisfied with that method[94]. Family planning providers should expect a significant number of women to discontinue their chosen contraceptive method, and these will need to be switched quickly to another method if they still need contraception[87].

Malawi is known for its high contraceptive prevalence rate: 42% of married women report in cross-sectional surveys that they are currently using a modern method of contraception, which is amongst the highest in the region[1]. However, using data from retrospective contraceptive calendars of 23 Demographic and Health surveys (DHS), Ali and Cleland found that three months post-discontinuation, only 20% of Malawian women had switched to another method, as compared to 38% of Kenyan and 46% of Ethiopian women[87]. This suggests that following contraceptive discontinuation, Malawian women may be at higher risk of unintended pregnancy compared to women in other countries in the region. This should not be a surprise, considering also that Malawi has amongst the highest total fertility rate in the region at 5.7 births per woman, as compared to 4.6 in Kenya, and 4.8 in Ethiopia[163].

The qualitative study presented in this paper was nested in an innovative one-year prospective study conducted in Northern Malawi in 2012-2013 to explore contraceptive switching and discontinuation using data collected on patient-held records. That quantitative study estimated contraceptive use (excluding condoms) at 35.1% amongst married women[155], slightly lower than the equivalent DHS cross-sectional estimate of 36.5% for the district. It also revealed high rates of discontinuation of short-term methods (oral contraceptive pills (OCP) and injectables). This qualitative study aims to shed light on the results of the quantitative study, by better understanding *reasons* for contraceptive choices and changes, and exploring facilitating factors and barriers to continuous contraceptive use.

This was done with the objective of understanding why fertility remains persistently high in Malawi, despite relatively high reported contraceptive use.

Study setting

This study was carried out through the Karonga Prevention Study (KPS) – a project in rural northern Malawi with a thirty-year history of epidemiological, demographic, immunological, and social science research. KPS is situated in the north of Malawi, amongst a patrilineal Tumbuka-speaking population. KPS has operated a demographic surveillance site since 2002, covering around 35,000 people. Recent studies have focused on adult HIV, fertility intentions, infertility, male involvement in women’s reproductive lives, and contraception. It is a well-studied area, the study population are familiar with KPS, and a high level of trust has developed between KPS and the study population as a result of the long-standing relationship over the three decades. The community has proved to be relatively open and willing to participate in a range of studies.

Demographic Health Survey (DHS) cross-sectional studies estimate the proportion of currently married women in Karonga district reporting use of modern methods of contraception at 45%, with the most commonly used method being the three-month injectable Depo Provera (20%), followed by tubal ligation (12%), condoms (9%), implants (3%), and oral contraceptive pills (1%)[1]. It is likely that short-term methods, and condom-use in particular, are over-estimated in the DHS, as no allowance is made for continuity of use [155].

Contraception is provided free at government health facilities, Christian Health Association of Malawi facilities, and at the community-level by Health Surveillance Assistants (HSAs) who provide injectables[53], and Community Based Distribution Agents. Banja La Mtsogolo, a private provider affiliated with Marie Stopes International, visits health facilities once a month to provide free long-acting methods, as part of their outreach activities.

7.2.3 Methods

Researcher team

The research team was led by a female British demography PhD candidate (author: ANZD) who had previously worked on contraception programmes, is concerned by the high fertility rates in Malawi, interested in the role of contraception, and has some previous experience of qualitative research in other topic areas. Two Malawian Tumbuka-speaking women who were already trained in qualitative research methods, conducted all the interviews (including the interview supervisor, author DM). They have extensive previous experience in conducting in-depth interviews (IDI) on a range of sensitive issues including antiretroviral therapy (ART) attendance, and male involvement in women's health, and hence were well-trained in spending time to build up a rapport with study participants. Additionally, three male Malawian Tumbuka-speaking individuals also with experience of conducting qualitative research, provided assistance to the two interviewers with transcribing and translating the interviews. Three British female supervisors (authors AC, BZ, and SM) at the London School of Hygiene and Tropical Medicine provided guidance to the research team. AC has been living and working in the study area for 15 years, BZ has been involved with the DSS from its inception, and SM has conducted qualitative and mixed-methods research on contraception in other African countries. Study participants only met the two female interviewers, and not the other researchers involved in conducting the study.

Study participants

The study participants for this qualitative study were all recruited within one month of completing their participation in the longitudinal quantitative study. Purposive sampling was used to identify nineteen women aged 15-49 to be invited for in-depth interviews (IDIs). Women were selected to represent a range of demographic characteristics (age, marital status, parity), and most importantly a variety of histories of contraceptive use, based on the

data already collected in the one-year quantitative study. All the selected women had been, or were currently married, and the majority had also borne children. Details for each individual in terms of age, marital status, children borne, schooling, occupation of self and husband were known to the researchers, but are not presented individually here due to potential for disclosure, and therefore breach of confidentiality.

It was ensured that contraceptive method-switchers, discontinuers, continuous users, and non-users were all represented, in order to understand motives in all four groups. It was possible for one woman to contribute to more than one of these categories, for one or more of the following three reasons. First, it is possible that a woman could experience more than one category in the study year, e.g. switched methods, and remained a continuous user. Second, although women were selected on the basis of the contraceptive profile given by the quantitative study, the woman's reported contraceptive use in the in-depth interview might not match the data as collected in the quantitative study. Third, women also spoke about their historical contraceptive experiences occurring prior to the one-year quantitative study, and so commonly had other experiences in addition to those captured by the quantitative study. Therefore, although a woman may have been selected to provide insights into one type of contraception dynamic, she could also provide data on other categories, which showed that it is not helpful to label women as only one kind of contraceptive user.

All participants were approached face-to-face in order to explain the study aims and methods. The interviewer read the information sheet, answered any questions, and asked the participant if she was willing to participate in the study. No woman refused to participate, and all provided informed written (or thumb-print) consent. Recruitment of respondents stopped when all categories of contraceptive users had participated in the study, and the researcher and interviewers felt saturation had been achieved: they were not getting any new information from additional interviews.

Study Design

Data collection took place between February-May 2013. Each in-depth interview lasted roughly one hour. Debriefing between interviewer and researcher took place on the same day, or the next day. Field notes were taken by the interviewer, and the researcher made notes during the debriefing. If, following debriefing of the first interview, some information or insights remained unclear, a second interview was held with that participant, in order to clarify. This happened on five occasions.

The IDIs typically took place at the study participant's home. However, the respondent was also offered the opportunity to be interviewed elsewhere in the community (e.g. in a room at the local health facility), particularly if they were concerned about confidentiality during the discussion. Only one participant took up this offer; the youngest woman, aged 16 years. The interviewer ensured that the location for the interview was not disturbed by others, and that others could not eaves-drop, so that only the interviewer and the respondent (and occasionally the respondent's infant) were present during the discussion.

The interviewers used a semi-structured topic guide that had been developed in English by the researchers based on the existing literature and research questions, translated into Tumbuka and repeatedly revised during data collection as a result of insights gained from debriefing, with input from the interviewers. After asking about their family and household situation, women were asked to provide a narrative history of their contraceptive use. The interviewer probed their motivations to use, not use, stop, or switch methods or providers. A retrospective six-year calendar was used to aid memory of contraceptive experiences, pregnancies, births, miscarriages, and terminations. This tool proved extremely difficult to use due to memory recall issues and unfamiliarity with calendar representation of time, even when limited to the previous two years. This has implications for the reliability of retrospectively reported data from contraceptive calendars. Interviews covered communication and decision-making processes, childbearing intentions, and attitudes to the quantitative contraception study methods.

Data management

Interviews were audio-recorded, transcribed, and translated from Tumbuka (or Chichewa in one interview) to English by a team of five individuals. Transcription and translation took place part-time from March-October 2013, and all data were kept on password protected files. The interview supervisor (D.M.) reviewed one transcript from each of the translators, to assess the reliability of the translation. No major problems were identified, but if the supervisor identified a translation she disagreed with, she discussed this with the translator and they agreed together on the most accurate translation.

The lead researcher went through ten transcripts in detail with the interview supervisor, discussing meanings of the common translations and phrases, and addressing any queries. This was done to ensure the researcher had a correct understanding of the content of the interviews.

Data analysis

The lead researcher familiarised herself with the data and discussed emerging themes and the analytical approach with co-authors. Based on a prior review of the literature on reasons for use and non-use of contraception, seven broad themes were identified: side-effects and health concerns; interference with sexual pleasure; husband's attitude; service access practicalities; effectiveness of a method; ambivalence/fatalistic attitude to child-bearing; and cultural acceptability. These seven broad themes were used to code the transcripts. Based on the content of the interviews, an additional theme was included: desire for children, which captured pressures like household economic concerns, as well as an active desire for children associated with high-fertility norms. Transcripts were also coded for: provider-switching reasons; an evaluation of the quantitative study methods; and an enquiry concerning the woman's interpretations of Malawi's puzzle of continued high fertility despite high contraceptive use. These data will be presented elsewhere. The lead researcher used Nvivo (QSR, Melbourne, Australia) to code and manage the data. Each individual's interview was summarised, and each broad theme was outlined. Sub-themes

within each broad theme were identified, described and managed in Excel, and links between sub-themes and broad themes were identified. The emerging factors influencing continuity of use, discontinuation and switching could be clustered in three spheres: individual, cultural and programmatic. This systematic analysis was therefore influenced by both thematic content and framework approaches.

Ethical considerations

The London School of Hygiene and Tropical Medicine and College of Medicine, University of Malawi Research and Ethics Committees granted ethical approval for both the quantitative and qualitative study.

7.2.4 Results

Participant characteristics

The aggregate profile of women respondents is presented in Table 7.1. Most women had undergone recent HIV testing, and no-one was known to be HIV positive at the time of interview. All women were currently or had previously been married, and the majority had also borne children. By chance, none of them had reported wanting a child within two years in a previous survey on fertility intentions (although their fertility intention may have changed by the time of the in-depth interview), suggesting all women were likely to have needed contraception to avoid pregnancy.

Table 7.1 Profile of the women respondents

Characteristic	Grouped description of the 19 respondents
Age	5 aged 16-24, 10 aged 25-34, 4 aged 35-48
Marital status	All were currently married (both monogamous/polygamous) or separated
Parity	7 had 0-2 children, 9 had 3-5 children, and 3 women had 6-8 children
Education	2 None/primary 1-5, 10 Primary 6-8, and 7 Secondary+
Fertility intention	5 Want no more, 8 Want to wait 2 or more years, 1 Unsure, 5 missing data

*Women were asked in cross-sectional surveys their fertility intention, and the most recent response (2010-2011) prior to IDI was used. Responses were categorised as: want within two years, want to wait 2 or more years, don't want any more children, or unsure.

Cultural context

This is a high fertility community, with high fertility norms. There is a great importance on bearing children, and so too, a fear of losing fertility in the long-term from contraception, which would be unacceptable.

“I discussed (family planning) with my mother, hahahaha! She said that, ‘You should give birth more and fill this Earth.’” (IDI 03)

Many women reported the common practice of fostering: their own children being raised in other households either short or long-term, or they themselves raising children that were not their own biologically. This typically occurred when the biological mother or father

were not able to care or adequately provide for all their children at that time, and so extended families assisted, and helped share the costs and responsibility of child-rearing.

There were a number of factors that affect women's fertility intentions, including household economic concerns:

"You have to budget because you cannot have six children in six years, then you fail to take good care of the children to the point that they start going to bed with an empty stomach." (IDI 05)

as well as the availability of social support networks and relatives to assist with child rearing. The availability of extended family to temporarily look after one's own children was an important facilitator to having many children, that the absence of nearby family was cited as a reason to not have any more children:

"What bothered us a lot was our child was giving us a lot of problems in that she was getting sick now and then. So we don't have relatives here, they are in the village, so I started teaching him that 'Come by husband, let us start family planning since we don't have relatives here. Look if we don't space for this child, and I get pregnant. What if one of them gets sick, how will I manage? Will I ask my friend to look after her?' So that's when he understood." (IDI 07)

Husband's fertility intentions were also important. In almost every interview was the implicit understanding that on the surface the husband is the authority and his instructions must be obeyed:

"Can someone refuse when her husband says that they should bear another child? You can't refuse. You can be asked about the reason the moment you refuse. So I just accepted that we should indeed bear another child... I just accept whenever the owner husband demands that we should bear another child. If the husband says that we should stay (wait) for some years then I also follow." (IDI 10)

Child spacing is so important – for the health of the mother and children, and to indicate that the couple is observing postpartum abstinence – that there is great shame associated with poor child-spacing. There are numerous Tumbuka words to describe having

children too close to each other. It leads to ostracism and the burden of shame is borne predominantly by the woman, not the man:

“If someone having a young child becomes pregnant, people stop paying visits to the house, and they can’t even ask for water to drink, because you have given birth to another child without spacing... They say that it’s pregnancy for ‘chiwulila’ (unplanned pregnancy soon after having a previous child), so they become scared... if that (chiwulila) can happen like here, that would mean my mother-in-law and the other relatives won’t visit us.” (IDI 15)

Inconsistent Use, and the Dichotomy of Self-Identifying as a “User”

In some of the interviews, women initially described themselves as family planning users, but upon further probing during the interview, it emerged that she was technically not currently protected. Similarly, several women described past episodes of their lives where they regarded themselves as users, but were not adhering strictly to the method requirements, and got pregnant.

Despite high fertility norms, most women reported in the IDIs wanting no more children, fewer children than they already had, or had desires to space their children. However, the ability to consistently use contraception in order to achieve their fertility desires was often lacking. In multiple interviews, women gave the impression of experimenting with a combination of contraception, occasional condom-use, and traditional methods between pregnancies – showing some intention to not get pregnant – but nevertheless ending up with larger family sizes than intended. IDI 08 has eight children, desperately did not want any more children and her latest births were unintended. She describes her contraceptive use between births:

“On the fourth child I obtained three injections but after the three injections I stayed more than six months doing sex without getting a pregnancy but later I found that I got pregnant. I started obtaining the injection when my child was one year old. That

was after the fourth child but on the fifth child I also obtained four injections and also helped me for a long time and also on the same child I also used traditional medicine which I obtained from elderly women. I did this after I heard that injection is not good, so I got the medicine from them and wear them on my waist. I also did the same on the sixth child but after the seventh and eighth I also used injections so that I may be protected.” (IDI 08)

Despite repeatedly using injections between children, she nevertheless ended up pregnant so many times. Even in cases where women were not using contraception continuously, they still tended to view themselves as contraception users. Any resulting pregnancy was not perceived as unexpected, and was seen as a limitation of the method of contraception (a contraceptive failure), rather than a limitation of her not using it properly or taking it continuously.

Another apparent contradiction is provided by IDI 21. She has had two injections in her life, and has rarely used condoms. She describes from her own experience that health care providers set a month and date that she has to go back again for her next injection, demonstrating an understanding of the need to have follow-up injections on time. She also explained to the interviewer that missed appointments are the reason so many women have children in Malawi. Nevertheless, she goes on to explain:

“As for me when I get that one injection, I stay for many months without having a child... some can stay for a year with that one injection without being pregnant... I saw that I stayed for a year without being pregnant... even if I stop getting the injection.” (IDI 21)

The interviewer suspected the respondent was not aware of the contradiction she was making, nor that she herself was at risk of pregnancy given she was leaving a long gap between her injections. The respondent had identified herself as being a contraception user, even though she was not using it consistently.

Concern about losing fertility and taking a long time to get pregnant after stopping contraception is commonly mentioned, and justifies stopping injections earlier than intended

to get pregnant. This contributes to a woman's self-perception of being a contraception-user, even if she has discontinued.

"I hear from people that whenever someone who has used family planning for a long time stops using them, it takes a long time for her to get pregnant. Maybe it can be that the treatment is still working in the body." (IDI 19)

A woman who has never used modern methods of contraception and says she has completed her family size, nevertheless says she will delay using contraception, but it is unclear why she wants to put it off given she is presumably at risk of pregnancy until that time:

"I am thinking that I should visit the hospital to close my tubes ("closing the tubes" means tubal ligation). When my youngest child reaches nine years of age, I will close my tubes because I may give birth at old age." (IDI 17)

Some methods are seen as inherently unreliable, e.g. withdrawal, condoms:

"I don't want to give birth very quickly, condoms are not trustworthy, a man can put it on but you may find that it has burst, so injections are better", and when asked if her husband wears a condom: *"Sometimes he wears, sometimes not."* (IDI 02)

Another woman also described how condoms were unreliable because she did not always have control over whether they are used:

"Sometimes he could argue with other people somewhere and when he comes home he could demand unprotected sex, so how could I refuse. So that was the reason that actually made me to use pills as a family planning method" (IDI 10).

But other short-term methods are also seen as unreliable. IDI 06 used injections between each of her six children and identifies her last born as an unintended pregnancy, suggesting she had not been using injections consistently. Therefore, she sees injections as unreliable, leading her to switch to female sterilisation:

Interviewer: *So you would have been using injections and have more children?*

Respondent: *No, I refuse to that; I didn't want to fill a basket with children, that is the reason I thought wise to close ("close the tubes", tubal ligation).* (IDI 06)

Another woman describes the troubles her sister experienced, trying to use short-term methods but nevertheless getting pregnant, presumably because she was not using the methods consistently:

“She had a child then after that child she took pills but still she was found pregnant with a child while taking the pills, so later she changed saying that ‘I should try injection’ but still more, was found with pregnancy.” (IDI 03)

Some women described how it is possible to get pregnant while using contraception if they missed appointments, acknowledging the importance of attending for repeat appointments on time, and demonstrating an understanding of the method.

“I’m a good example, I was using injections but for someone to be pregnant it means you have missed the appointed date. So when they tell you to come at such date you have to go, but if you don’t go, and you have sex with a man, you will obviously get pregnant. When the doctor assigns a date they know that reaching such a date the injection would have lost its strength and if you do get the injection you cannot get pregnant, but if you miss the date assigned for you at the hospital, you can get pregnant. I also missed my date and I got pregnant.” (IDI 06, eventually got a tubal ligation).

Both those quoted below had missed injection appointments themselves and become pregnant, but still identified themselves as being contraception users, even though they were not using consistently:

“Those are the women who goes to the clinic and get injection, but on the appointed date they don’t go and when they stay some time they become pregnant and later they go for family planning again, so they give birth after a short period of time.” (IDI 04)

“Actually this happens, and they even advise us when we go for family planning, they say that when your appointment date is due you are supposed to come, or even if it has found you elsewhere you are still supposed to go where they offer this, but if

you won't, then avoid meeting with your husband, let him give you time to get injected.” (IDI 05)

Another woman also shows understanding of the need to attend for appointments on time, and recognises that missing an appointment can result in a pregnancy:

Interviewer: *What do you think can be the cause for other women who use family planning but they are found pregnant?*

Respondent: *I think for those who say they are using family planning but they have become pregnant, it's because they missed their day of getting the drug. What happens is that when you get the method today, they give you a date and when you miss that date then you have messed up. (IDI 12)*

Others went as far as suggesting missed appointments are inevitable. IDI 02 already had two children and said she only wanted two children in total; she had already reached her desired family size. However, she also said “*We will give birth in future but not now, yes. Maybe in 2016. Not very soon.*” When probed about the reasons for having this third child, she responded: “*Maybe I will miss injection. Unexpectedly*”. (IDI 02)

Individual Factors

Husband Attitude

The role, influence and relationship with husband or sexual partner is an issue that permeates all interviews, and is linked to every other theme. Some women describe supportive husbands who are concerned for the welfare and health of their wives, concerned about having a large family to support, accept contraception, and support their wives to switch in the event of method-related problems. One woman who had suffered issues with her own health following a traumatic still-birth four years earlier explained how her husband (himself a health care provider) encouraged her to switch methods when she was dissatisfied with one method:

“After I got married it’s when I had the miscarriage and thereafter I became severely sick. With this situation I then decided to stay for some time without bearing children by using family planning. I started by using injection, but what was happening was that I could menstruate continuously for up to three weeks. My husband then told me to change to another method and as of now I use loop.” (IDI 19).

However, for the majority of women, husbands tend not to be as supportive, at least not initially. Many men fear that their wife will get cancer or die from family planning, lose her fertility, or that it will encourage her to have extra-marital affairs:

“I was forbidden to use other methods when I said ‘I want to do family planning methods’, he said ‘No, I don’t want family planning, do you want to find other affairs?’ But I said, ‘No, I want to protect my child’, he said again ‘No’.” (IDI 02).

Husbands were more receptive to using condoms or withdrawal, and most women have used these methods sporadically with varying degrees of consistency at different points in their lives, usually such episodes of inconsistent use ending in pregnancies. However, women are concerned about the effectiveness of condoms and withdrawal methods, if their husbands become less diligent at using these methods consistently. As these are male-controlled methods, women are dependent on their husbands using these methods properly. Some women switched to a more effective and female-controlled method, but to avoid disclosure, they still had to participate in using methods relying on male compliance such as condoms, withdrawal, or traditional methods.

Interviewer: So you were just doing this (using contraception) according to your own power because your husband doesn’t allow you to use family planning. Seeing that you were not becoming pregnant when doing sexual intercourse with your husband, was your husband not suspecting you of using a method to prevent pregnancy?

Respondent: After I got pills, I could still encourage him to continue using condoms even though I was using other methods. (IDI 10)

She also complained that condoms interfered with sexual pleasure for their husbands, or less commonly for themselves, which led to inconsistent use.

“By using condoms sometimes I become bored and I feel like we should just do unprotected sex. In that case I can end up becoming pregnant and bear another child.” (IDI 10, who occasionally uses OCP)

As another strategy to deal with an unsupportive husband, several women described switching to a less visible method and using contraception covertly without their husband’s knowledge. Oral contraceptive pills (OCP) or injectables helped to facilitate this:

“I see that injection is very effective because you do it without husband’s knowledge, and you can be injected but no any sign on the place you have been injected.” (IDI 08)

IDI 07 describes a situation where her husband would not use condoms properly. Even though she used OCP it was only for two months, and she eventually discontinued and got pregnant:

“You find that when we are in the middle of making love he would come out and remove the condom. He can tell me that he is wearing the condom, while he is lying... So if my husband was acting clever now I have to show him how clever I am, that’s when I decided to use pills on my own. I got the pills from the hospital and then I was just staying. I didn’t stop taking the pills up to two months. Then I went to attend a funeral and my pills finished, so I had sex with my husband and I got pregnant... My husband was removing the condom during sex. I told him everything (that she could get pregnant) but he was refusing saying that it can never happen. Then we discovered that month I missed my periods and I told him ‘See now what you have done’, so he said ‘Sorry, it was an accident’.” (IDI 07)

Side-effects

Experience of side-effects – including unexplained health effects - are commonly a reason for discontinuing, inconsistently using the method or, in rare cases they are a reason

for switching methods. One woman suffered side-effects but eventually managed to switch to an implant with the support of her husband:

“I just received three injections only but on my way back I was losing balance, vomiting very severely and when I reached home, I could just lay down with heart pains, hot headache. After receiving three injections I stopped there until now I haven’t used them anymore but I planted Norplant (implant).” (IDI 03)

IDI 14 experienced an interruption in her periods and attributed not becoming fat to the injection she had taken, so she stopped as she wanted to put on weight. She was also battling with the fear of continuous periods, even though she was actually experiencing fewer periods. She occasionally used condoms, and then had another injection. Her fear of side-effects contributed to her using injectables occasionally but sporadically.

Women interpreted any change in menstrual cycle as an indication of whether or not the contraception was working. For example, if menstruation had stopped, this was taken as an indication that the contraception was still working in the body, and so it was not necessary to have the next cycle of OCP/injection, until menstruation (and inferred from this, fertility) had returned, resulting in inconsistent use of contraception:

“The problem which I faced was when I was using injection I could not do my monthly periods for a year, and then I decided to stop. I stopped for months but I don’t know how many months, but I stopped so that I should see if I could have my menstruation periods. Once I did (have my period), I said that I may take unexpected pregnancy so it is better that I should continue with injection, so I started again.” (IDI 01)

Related to this, were concerns about the return of fertility, after use of hormonal contraceptives. It was believed that after stopping injections, it would take a long time for fertility to return, and so women stopped injections assuming they would not get pregnant, and appeared somewhat surprised when they did. This woman experienced heavy bleeding from the injection and so when she went back to the hospital, they gave her OCP instead:

“Yes, I was given pills but I didn’t take them, because I took seven injections, so I had hope that, as my friends who use almost seven injections they stayed for years (without getting pregnant), but with me, after getting seven injections and then stopped there then there was no resting in giving birth, but I found that I became pregnant.” (IDI 04)

Moreover, women tended to attribute any change in health or body to contraception, regardless of whether there was any medical explanation. Some of the following symptoms could have been caused by anaemia, but disliking tea could not have been caused by contraceptive use:

“Whenever I was menstruating for a long time I discovered that I could feel visual problems, my heart was beating faster, and I disliked boiled tea. So I just accepted because what I needed was change to other methods... I disliked boiled tea maybe because my heart was beating faster due to the numerous blood that I was losing and I could feel dizzy. So I was thinking that disliking boiled tea was caused by this problem.” (IDI 19)

Shortly after, she switched to another method with the support of her husband.

Social pressures and influences

A number of external elements were mentioned that can be described as socio-cultural factors influencing continuity of contraception use. One of the greatest barriers to consistently using contraception was misconceptions amongst the community. The fear of *potential* side-effects or negative health events (e.g. family planning causing cancer or death, or concerns over changes in menstrual bleeding) was reported as a reason to stop using contraception more commonly than reports of actual experienced side-effects. However, no woman was able to tell the interviewer about anyone she *knew* who had died or got cancer as a result of contraception:

“I have never seen someone dying but others they like talking and cheating other people by saying ‘You are going for family planning, people are dying and others they get ill’.” (IDI 02)

Nevertheless, this was a very powerful deterrent and some women also reported stopping OCP/injectables if her friend had experienced side-effects, even if she herself had not:

Interviewer: *Why did you decide to stop using pills after finishing the packet you were given?*

Respondent: *I found that my friend was bleeding. After asking the cause I was told that it's because of the pills. Then I stopped.*

Interviewer: *Can you explain what was happening to her?*

Respondent: *She had continuous menstrual period*

Interviewer: *How long did she take?*

Respondent: *Ah, she was in trouble.*

Interviewer: *What problem did you face when you were taking pills?*

Respondent: *It did nothing to me. Nothing happened to me. (IDI09)*

Pressures imposed by significant friends or family influenced women's continuity of use. This was particularly so for significant others who themselves would be affected by the

woman's childbearing. A young separated woman who had lost custody of her two children from two previous husbands, and was currently living in her natal home, was under great pressure from her mother not to get pregnant by her current boyfriend (implicit was the assumption that she must use contraception). Her existing children had at first been denied by the fathers, but had since been claimed by them and taken away. The mother of this woman feared that again she would be responsible for helping her daughter to raise another young infant, with a father refusing responsibility, to the extent that this young woman was one of the most consistent contraception users. She managed to negotiate complex barriers such as stock-outs and a boyfriend who was disinterested in contraception, so that she maintained continuity of use and switched methods at times of stock-outs and unavailability, perhaps because the stakes of getting pregnant at this stage of her life were so much worse – both for herself and for her mother:

“It's my mother who advises me. She advises me that it can be stupid for me to get pregnant while still here at my parent's home, because the man responsible can refuse being responsible for the pregnancy as the first one did. This can also be a problem to them because they can be the ones responsible for everything needed for my pregnancy. This can be a difficult situation because the money meant for other things can be spent on me. So she advises me that I need to behave like a grown up person.” (IDI 15)

Another woman was influenced by her mother to stop using contraception as a result of negative side-effects and because the mother wanted her to have many children.

“She (my mother) said ‘Are you doing family planning?’ I said, ‘Yes, I am doing’. She said ‘So when you are doing this, how do you feel?’ I complained to her (side-effects). Then she said ‘This will harm you’. Then she took my health passport and threw it in the pit-latrine. Then I stopped (family planning).” (IDI 03)

Later on in life this woman got an implant, with support from her husband.

Programmatic Factors

There were a number of practical issues that affected whether or not a woman used contraception continuously. One woman (IDI 10) who travels frequently for her small business, asks her health care provider to give her multiple cycles of OCP, as a strategy to avoid running out when she is away from home.

HSA's provide contraception at the community level as an approach to increase accessibility for rural woman. However, the cultural acceptability of this service approach was raised by one woman, so that in this example, community-provision of injectables was stopped:

“The place we were meeting was this woman’s home (female HSA’s home), so when we were meeting at her place, according to our view of things in the village, they began to say that we were going there for a purpose and this man (male HSA) was having an affair with us, but not providing injections. Sometimes we were going five women or six in a day, but the tools (Depo provera) were taken back to the clinic so that every woman who wants Depo should be going to the clinic because we may implement bad reputation to the owner of the house, so it is good that we should change the place.” (IDI 08)

Issues around confidentiality were commonly discussed, particularly concerning their husband’s knowledge. Some women felt it was more confidential to go to the health care facility, whilst others experienced more privacy by seeing an HSA at their home. IDI 08 was so fearful about a breach in confidentiality that this caused her to stop using contraception:

“I stopped (using contraception) because when I went to the clinic sometimes I could find my fellow women, so the same women came and disclosed to my husband. They said that ‘That woman (respondent) has just entered into that room, there is something she is doing’, so I stopped because next time the other women will say ‘Let’s go and confirm (testify) what she does at the clinic’”. (IDI 08)

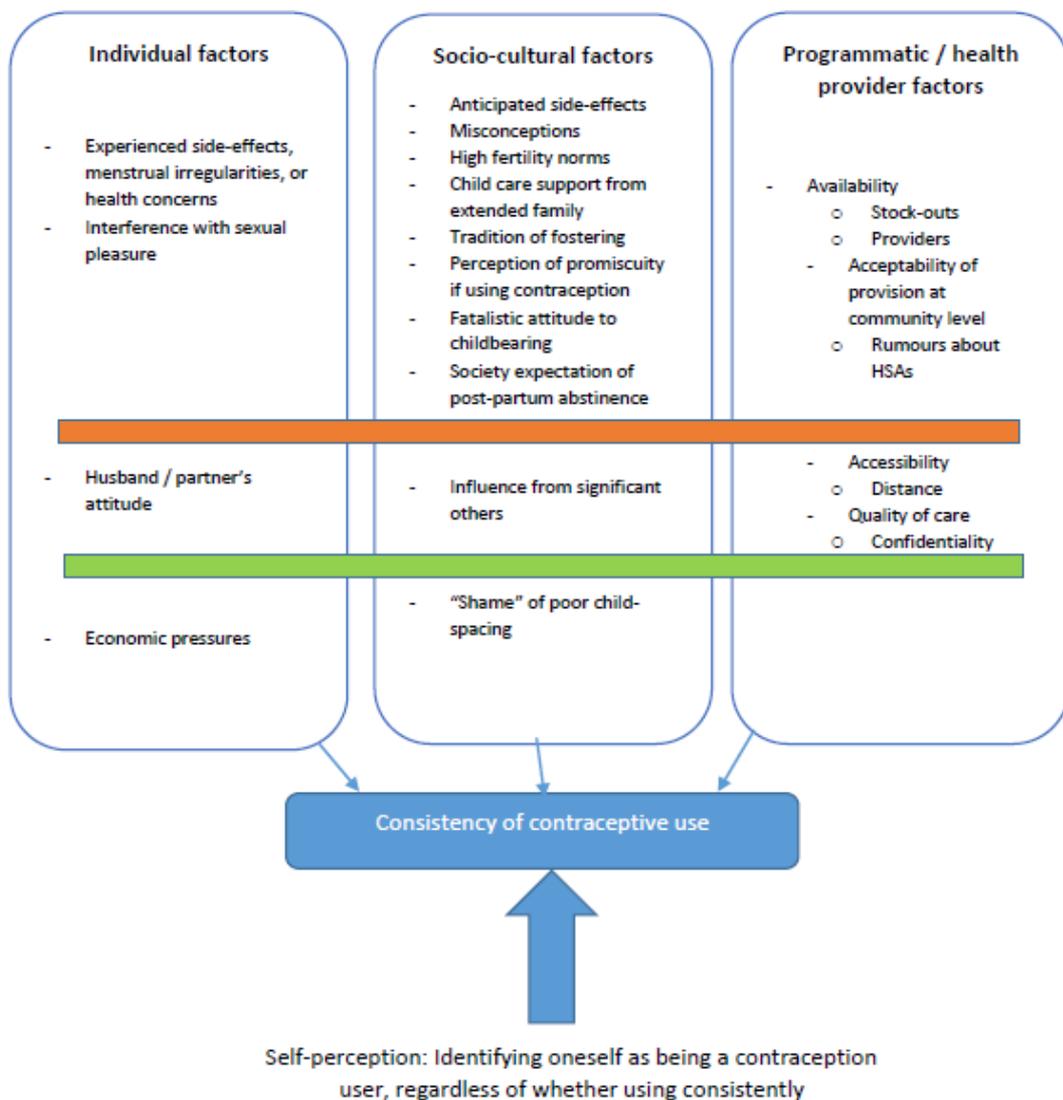
She denied using contraception to her husband, but nevertheless stopped:

“We continued arguing each other but I stopped because next time I might go and he would have means to follow me... so I should just stop”. (IDI 08)

Conceptual framework

The themes that emerged from the IDIs are presented in a conceptual framework (Figure 7.1). Key factors associated with consistency of contraceptive use were grouped according to individual, socio-cultural, and programmatic/health provider factors. Factors that generally prevent consistent use appear above the orange line. Factors that could go either way appear in the middle section. Factors that generally promoted consistent contraceptive use appear below the green line.

Figure 7.1 Conceptual framework of factors associated with consistency of contraceptive use



7.2.5 Discussion

Women identified themselves as contraceptive users, even if they were not using contraception consistently. Factors that are known to affect uptake (or not) of contraception, such as husband's attitude[35, 62], confidentiality of services, and side-effects were also mentioned by women as influencing their contraceptive adherence. Women who experienced barriers in one aspect, e.g. negative side-effects, became successful switchers if they experienced facilitating factors in other areas, e.g. their husband was supportive, or they were influenced by significant others. There were other less direct influences on inconsistent contraception use, such as high fertility norms, cultural expectations on childbearing, and the common practice of fostering, which weakened motivations to use contraception properly in order to achieve smaller families.

Women reported in the in-depth interviews that they had used condoms, withdrawal, and even injections/OCP at various points in their lives, but not necessarily with much consistency. This results in births that were unintended at the time of conception. Results from the quantitative study also revealed extremely inconsistent use of contraception in the study area, with high rates of discontinuation of injections and OCP[155]. Despite this, the fact that women do use contraception, even if inconsistently, suggests some intention to *not* get pregnant at particular times in their lives.

The key issue that emerged was that women appeared to view themselves as contraception users, even if they were not using contraception properly and consistently. Gaps in use of short-term methods, and missed appointments were normal, and in some cases seen as inevitable. All women either knew someone who got pregnant while “using” contraception, or they themselves experienced this. Women attributed a “contraception failure” as a limitation of the contraceptive method (akin to the limitations of traditional methods), rather than due to her using the method incorrectly. A fatalistic attitude contributed to the lack of urgency in keeping contraception appointments. Several woman thought that their fertility would be reduced for long after the three-months following an injection, particularly if she had not yet menstruated. This also contributed to late injection

appointments. High fertility norms in this community meant that concern over loss of fertility from injectables was difficult to tolerate. It is important that providers communicate clearly to women that hormonal methods do not cause infertility, and that women can get pregnant soon after they stop using.

At the same time, when asked what is the reason women in Malawi have so many children even if they say they use contraception, women routinely cited missed injection appointments as an explanation. This demonstrates an understanding of the instructions, the method-action, and the consequences of missing appointments. But somehow women do not see this as being applicable to themselves. If users do not accept that their contraceptive behaviour is inconsistent, they are likely to still consider themselves to be a contraceptive user and are at risk of unintended pregnancy.

There are high levels of temporary or long-term fostering, and some women describe the importance of having family nearby to help with raising children, and the role of the social support system, so the “cost” of bearing a child is not just borne by the parents. All this can promote high fertility. Previous literature has noted that fosterage can encourage pro-natal behaviour[4, 166]. Having children also helps to establish a home and a relationship, and having a child gives both a woman and a man status[48]. Nevertheless, women do tend to report wanting smaller family sizes than they currently achieve, particularly if they have financial concerns, and they receive information at health facilities on the importance of spacing their children. In spite of this, because of the social context in which women in this community live where high fertility continues to be the norm and the burden of an additional child can often be absorbed by the extended family[48], there was not a strong enough motivation to use contraception consistently in order to prevent a pregnancy. No women talked of wanting to go to work, or to finish her schooling in the in-depth interviews, although another study in the same area showed that early sexual debut and marriage is associated with school drop-out[142]. Given this context, barriers such as fear of side-effects, husband’s disapproval and confidentiality issues become amplified and can lead to gaps in use. However, some women were able to draw on support from their

husband or mother, and achieve a successful switch in method when faced with the same barriers. Similarly, some women who had disapproving husbands were able to use contraception if the provision of services was confidential.

In a context of relatively good provision of and access to contraceptive services, addressing incentives to reduce fertility so that women and men become more highly motivated to want smaller families and become committed contraceptive users, is recommended. This points to education of women so the opportunity costs of child-rearing increase. Communication messages on radio and TV shows that present examples of model families that are healthy and smaller and something to aspire towards, are recommended[12]. Presenting such families as the norm gives the impression that ones peers have smaller families, and there is evidence of conformity of behaviour[13]. Policy measures that increase the incentives of having smaller families are also recommended.

The study findings have implications for service provision for women who do not want to get pregnant. Long-acting methods such as IUDs and implants (which are much more effective and not male-controlled) should be promoted so that women will not miss appointments and are not inconvenienced with having to regularly search for resupplies[143]. Services must be fully confidential – both at facilities and at the community level – so that women who have not disclosed to their husbands are enabled to continuously use services. Although community provision of family planning is done with the aim of improving access[167, 168], consideration must be given for culturally acceptable approaches. Provision at a male provider's home was problematic in one example. Myths and misconceptions around contraception need to be dispelled[62]. Providers must re-emphasise that injectables will no longer prevent a pregnancy after three months, regardless of any changes in menstrual cycle, and that fertility *will* return. Given so many women were dissuaded from using hormonal contraceptives continuously due to unrelated changes in their well-being (e.g. disliking tea), a strategy could be to promote the view that these experiences are not unreasonable, and could be tolerated. For intolerable side-effects, women should be assisted to switch.

END OF RESEARCH PAPER

7.3 Additional Findings

There were additional findings on the facilitating factors and barriers to contraceptive use that were not included in the research paper, as they were not directly related to switching or discontinuation. Some of these findings are included here, as they provide a general understanding of additional factors associated with contraceptive use in this study area.

Husbands

Some women needed to educate their husband and explain to them the benefits of contraception, in order to persuade him to allow her to use it. In one case, the woman used information she had gathered from her friends, and argued that financially they would struggle with another pregnancy:

“We heard from others who say that it (family planning) is harmful, women they die, get sick, get thin, so we had fear. Then my husband said ‘people they die, so don’t take it, so let us continue using this method (withdrawal)’... Later I see my friends how they are going, as you know that women we tell one another what method do we use like others they take pills, others injection, and others here (on the arm, meaning implant). So then I decided to tell my husband by saying ‘my husband this will not work for us and the way we are giving birth will make us not to have properties for the house because each year you will be thinking about the needs for the pregnancy. I continued explaining to him how contraceptives are like and that they are not bad, then he accepted me to go and start taking injection.” (IDI01)

It is not always the woman alone who persuades the husband, with relatives, church elders and the community also helping to influence the husband’s attitudes, such that this woman not only used contraception as a young woman, but later on successfully switched from injectables to an implant without a gap of non-use:

“We were young during this time (just after marriage with one child), and we knew elders normally come and advise on how to behave when you are in the bedroom with your husband or wife at night. As for us, church counsellors came and advised us that you are a young couple, so you must be using family planning, and they left. As soon as they left me and my husband, then my husband said ‘Go my wife and start family planning’.” (IDI 05)

The impression given from the in-depth interviews is that condoms are haphazardly used, and are dependent on the temperament of the male partner. Much of the language used suggests out-smarting the other, deceiving, or cheating one another.

“I was thinking my husband was wearing it properly (condom) without knowing that he was using his tricks. I knew this at one time after we had sex; he removed the condom and gave me to litter. So when I went to litter I saw the semen coming out and I asked him what happened, he said, it burst and that time I trusted his response. But on the second time, I observed the same thing. But on the third time, I pretended to face aside while my eyes was looking at him and I saw him cutting the bottom of the condom”. (IDI 08)

IDI 15 recalls experiences with a previous husband from whom she is now separated:

Respondent: We indeed discussed that we need to start using family planning methods, but men are troublesome so he rejected me from using family planning methods saying that he will know the method to use. Considering that the child was still young during that time I had to secretly use pills because I wasn't sure about the method that he was supposed to use.

Interviewer: By saying that he will know the method to use for himself what method was he actually referring to?

Respondent: He didn't mention about the method, he just said that he will know for himself.”

Interviewer: The way you observed him, was there any method that he was using or maybe those words were just meant to deceive you?

Respondent: *He was just meaning to deceive me with his words, but I didn't see him using any method.* (IDI 15)

In the case where the husband later discovers his wife to have been using contraception without his approval, this causes marital strife. For one 33-year old woman who has given birth to eight children, two of whom have died, her strong desire to use contraception and stop childbearing is an on-going quarrel in her marriage, and a cause of great upset.

“There is still conflict and I have persevered for I have given more children and they are enough. There was a certain time that I started going to the hospital to close the tubes (tubal ligation), but on my way my husband thought of following me and took me back home. So I said, ‘You are refusing closing the tubes and also injections, so what is the method that will help us in our marriage? Because as a person you have to decide, for things are difficult at present (cost of living). You may say that I may not struggle to deliver a child but the time may come that I may not be delivering very well’. Then I said that I have to take a break, he said, ‘No, I want a child’, I said ‘These children are enough, six children that are alive, are they few?’ So conflicts are there but I persevere that I should just leave it as it is (with the six remaining children).” (IDI 08)

Side-effects

For women whose health had suffered, contraception was seen as important to help preserve their own health:

“I asked in our marriage that, ‘My husband, I delivered a child through operation (c-section), so it is very important that I should use contraceptives because I fear of dying early’, so he accepted and I went.” (IDI 12)

Contraception was also viewed as being important to preserve the health of existing and future children:

“I remembered what I did with my first child who didn’t grow ‘tinya’ (giving birth to another child in a short period of time). So I thought of just starting family planning on my own up to the time my child grew the way I wanted” (IDI 07), and: “I just do these family planning methods on my own as a woman because I cannot carry children on my back now and then, and end up staying without bathing, looking smart. I just do that according to my own power in order for that young child to grow well without being tormented.” (IDI 10)

As a result of earlier public health messaging and the promotion of family planning for spacing, women are well aware of the importance of child-spacing, but there are additional cultural pressures to space children, as a confirmation she is practicing postpartum abstinence, which is still observed in the community:

“They (my parents) taught me that my daughter, now that you are married you are supposed to be spacing so that you just avoid having children now and then, because if you do then you will bring us shame... When you are in the bedroom with your husband you must be discussing on how you can space your children. Because even at the hospital they advise us that if you want your children to grow healthy you must be coming here and start family planning like injection.” (IDI 05)

Ambivalence or fatalistic attitude to childbearing

A few women provided non-numeric responses to the number of children they would like, suggesting a certain lack of control over their lives, or limited insight on the potential to regulate or space childbearing, e.g. IDI 20:

Interviewer: *How many children do you want to have?*

Respondent: *I can’t know, it is for God, so I can’t know.*

Interviewer: *If God can give you chance that you should choose, how many children I should give you?*

Respondent: *God can’t do this, he is the one who knows.”*

A response from IDI 17 suggests the relationship between contraception and desired family size are not so clearly linked:

“We don’t sit down and plan how many children should we have in our marriage, but we just discuss which method of family planning should we use”.

Interference with sexual pleasure

Interference with sexual pleasure was another barrier to contraceptive use. For one woman who did not use modern methods of contraception, withdrawal was difficult for her husband to practice:

“Sometimes when a husband feels very sweet (sexual feeling) he could fail to withdraw and the problem is this, you get pregnant so quickly” (IDI 17), and

“He says he doesn’t feel good to use condoms, but ‘sumbi ku sumbi’ (egg to egg, unprotected sex)... On condoms, there is a problem that people don’t feel sweetness of sex or orgasm.” (IDI 17)

The importance for a husband and wife to have sex without a condom has also been found by other researchers working in Malawi[80, 81].

Cultural acceptability

Numerous women talk of influences from family, friends and neighbours to learn about contraception. Some persuade or dissuade others to use contraception, or they also influence to have children or stop child-bearing. These family and friends appear to be important particularly when the husband is not supportive; e.g. neighbours might invite a younger woman to join them at the clinic when they are going for their injections (previous research also describes women supporting one another to use contraception[74, 75]).

Most women do not know much about family planning until they are married, and there was the implicit understanding that these conversations were not appropriate for never married women

“The first time I heard about family planning was after I got married.” (IDI 05)

However, in the case of a very young newly married couple, this provided the opportunity for relatives to advise:

“We were very young the time we got married, my husband was young and I was also young. We were never married before; our parents were trying to help us here and there by advising us.” (IDI 05), and

“We got married already and after having this child, so, there was my aunt at the hospital who was the sister in-charge and she told me that ‘You are of young age and you don’t know about marriage issues, so after your child is six weeks old, when you come for under-five clinic, it will be good if you will start doing family planning’”. (IDI 03)

Related to the issue of cultural acceptability of contraception for younger women, was an example of a relatively young woman who had completed her desired family size and therefore sought a tubal ligation, but the health care provider refused and advised her she was too young to be sterilised and suggested she choose another method:

“I asked them if they could just close my tubes but they refused and said ‘You are still young age and sometimes you may want to be pregnant, so you will suffer and come back here’, so they just leave me”.

In situations where women did not use modern methods, some reported trying more culturally acceptable techniques as advised by traditional healers – such as drinking ashes in water, wearing beads around the waist, or breathing in deeply after sexual intercourse – as an approach to preventing pregnancy, although most reported impracticalities and difficulties using these methods, not to mention concerns over efficacy:

“I get the ‘josi’ (ashes), put in a cup and drink, that’s one way of family planning, whether it’s ashes, I take them and put them in a cup and drink, it’s also family planning method.” (IDI 06)

Desire for children

A 37 year old woman who had six children (one died), had previously used injections intermittently between her births, and who recently got a tubal ligation gave her impression on why women want many children:

“Nowadays, people say we have to give birth as the whites, so you can have two. Sometimes we think of continuing having more children because of our desires. Sometimes we think that if we only have two children and God has taken them all, that means we will have no children. That’s why we have five, six, seven or eight children. But the recommendation is that after having two you can go and close (tubal ligation) but because of our desires, that’s why we continue having more children... They (women) don’t pay attention to the advice given at the hospitals. They say that at the hospital they just cheat us that we should not be giving birth for things are now expensive, even the government says the same thing, but people say that they don’t care. They say ‘They tell us to stop giving birth! Did they themselves stop?’ So people ignore what they are advised, then we keep on giving birth to more and more children. They even say that we cannot listen to the doctors because they don’t look after our children. We look after them ourselves.” (IDI 06)

Upon enquiring after the interviewer’s situation and learning she had two children, she encouraged the interviewer to have more children.

Service delivery issues

Proximity to a health facility or a community-level family planning provider, and availability of methods (with no stock-outs), are general facilitating factors for contraception use (though not necessarily adherence). IDI 21 received her first injection at a government clinic, and then her second injection at the house of an HSA as it is more convenient:

“I explained to my friends that I was at Jetty (health facility) for family planning injection, but they told me that I was just troubling myself to go to Jetty while Mrs X

offers that service, she is a health worker. She also has the injections. That's when I went to her for the second injection."

Several others also agree on the convenience of visiting a community provider as they can be seen at any time rather than fixed clinic open hours, and it is quicker than waiting at the health facilities. Most women described experiencing provider-initiated conversations on family planning typically at under-five clinics.

There were also a number of misconceptions around long-acting methods. For example, some women believed they needed to get their husband's consent in order to get a long-acting method of contraception. Typically women understood that if they were to get the implant (which lasts for five years), it would mean they were committed to having no children for at least five years. This was not acceptable for many women who wanted to space their children but not for so long, and therefore this misconception was a barrier for their use of a long-acting method, and instead they chose short-term methods such as pills or injectables. Women are supposed to be able to get an implant for free, and to remove it for free, even before five years have passed. However, one woman was concerned about getting an implant as she was under the impression that although it was free to receive the implant, she would have to pay to have it removed, and so financial concerns were a barrier.

7.4 Abortion

One woman described how her husband was arguing that she did not need to use contraception, as if she got pregnant she could have an abortion. The woman did not like this suggestion, as she was fearful for her life to have an abortion and concerned that her children would not have a mother. She also disagreed with it on moral grounds.

7.5 Contraceptive calendars

The interviewer used a contraceptive calendar as a tool to help the woman recall her contraceptive use over the previous six years, when conducting the in-depth interviews. However, it quickly became apparent how difficult it was for women to recall their contraceptive use, even for the previous year or two. In some cases, the provider-recorded data captured on both the woman's family planning card and health passport did not correspond with the woman's retrospective reported use in the in-depth interview.

7.6 Limitations

Table 7.2 presents some of the limitations associated with the qualitative study, together with the rationale for conducting the study in this way, and strategies to address the limitations.

Table 7.2 Limitations of the qualitative study

Limitation	Rationale or strategy to address the limitation
Generally only one interview conducted per respondent, rather than repeat interviews for everyone	Due to time-restrictions and focus on the quantitative study. Therefore repeat interview only held with five individuals, where clarification was needed.
Small sample size	Reasonable for a qualitative study. Aim is to give greater insight into quantitative data, rather than conduct exhaustive qualitative study.
Sensitivity of issues: women may have been hesitant to respond honestly to questions.	Interviewers highly trained in qualitative research. Interviewer probed sensitively, explaining confidentiality.

7.7 Summary

The contraceptive calendar was used as a tool to aid discussion between the interviewer and study participant. However, it became clear that women's retrospective narratives were often inconsistent with the data collected on the family planning card. This has implications for the reliance of conventional studies on calendars as a tool for collecting data on episodes of contraceptive use. This work suggests that the calendar approach may only be reliable for about one year before the interview date, and cautions against over-interpretation of retrospective reports collected in this way.

One of the key findings from the qualitative research was the discovery that many women consider themselves to be contraceptive users, when technically they are not. This self-perception of being a contraceptive user could in part be contributing to over-reporting of contraceptive use in cross-sectional surveys, which would over-estimate the contraceptive prevalence rate. This has implications for the way the family planning community interprets contraceptive data from cross-sectional surveys such as the Demographic and Health Survey, and suggests that probes should be added to surveys in order to establish continuity of use. It also has implications for the way contraceptive services are provided: greater efforts should be made to educate women on the pregnancy risks of presenting late for short-term methods.

There are a number of other factors involved that affect continuity of use, many of which are similar to the facilitating factors and barriers to general contraception use that are already well researched. These include husband attitude and side-effects. Knowing that the factors associated with adherence are similar to the factors associated with uptake of contraception is important, as programmes must therefore tackle the same kinds of issues. Women tended to negotiate the barriers in different ways, and drew on the strengths of the facilitating factors to adhere to contraception. A woman who experienced multiple barriers was more likely to discontinue with contraception.

Health care providers might tailor their advice based on individual women's personal circumstances. For example, a woman who is struggling with negative side-effects but has a supportive husband, might benefit from counselling from the provider to suggest trying a different method given her husband is more likely to tolerate a new method. Another woman who is experiencing side-effects with the injection but does not have a supportive husband, might benefit from the health care provider suggesting she try to tolerate the side-effects if they are manageable, given it may be difficult for her to use another method of contraception for fear of disclosing to her husband.

8 Paper E: Post-partum uptake of contraception

8.1 Introduction

A section of Chapter 4 examined the stability of fertility intentions, and explored how changes in family circumstances and the birth of a child affected a woman's fertility intentions and contraceptive use. These factors in turn are determinants of fertility. The final paper in this thesis focuses on the event of a birth to a woman, and looks at postpartum family planning. It is an important area to investigate as it has been shown that short birth intervals are associated with a number of negative outcomes for mother and baby. Therefore, postpartum women are a key group of women to target with services. Typically, women do not wish to become pregnant soon after delivering an infant, and they may have more contact with the health care system (due to infant vaccinations etc.) and postpartum family planning is thus a low-cost way to help women to space their children.

Using contraception data that were collected (as described in Chapter 5) for the quantitative family planning card study, time to uptake of postpartum contraception is examined. The paper also considers the role of postpartum abstinence, and comments on the cultural pressures to space children.

A long-abstract was peer-reviewed by the International Union for the Scientific Study of Population (IUSSP) Scientific Panel on Reproductive Health, for a Seminar on "Promoting Postpartum and Post-abortion Family Planning: Challenges and Opportunities" and this paper will be presented in Cochin, India on 11-13 Nov 2014. The IUSSP might prepare a special issue from a selection of the papers presented at the Seminar. The paper therefore cannot be submitted to a journal for review until after the IUSSP Seminar has taken place.



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AD conceived the research question and analysis approach. AD, MC, BZ, AC supervised data collection. AD cleaned and analysed the data and drafted the manuscript.

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Date 13 October 2014

SUPERVISOR/SENIOR AUTHOR'S SIGNATURE (3 above)

Bassia Zabe

8.2 “Postpartum uptake of contraception in rural northern Malawi”

START OF RESEARCH PAPER

Postpartum uptake of contraception in rural northern

Malawi

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Date of last revision: (1 October 2014)

DO NOT CITE WITHOUT AUTHORS' PERMISSION

8.2.1 Abstract

Background: A large proportion of postpartum women in Africa do not wish to become pregnant again soon after delivering an infant, but many do not use contraception. Sexually active women whose fecundity has returned are at risk of unintended pregnancy.

Methods: A demographic surveillance site (DSS) in rural northern Malawi was used to identify 7,393 women aged 15-49 who were eligible for a one-year prospective longitudinal study of family planning using provider-recorded data on patient-held records (2012-2013). The data provided a reliable record of time to uptake of contraception after delivering an infant. The average timing of resumption of sexual activities after postpartum abstinence was estimated from a population-based sexual behaviour survey in the DSS (2010-2011). In-depth interviews with 19 purposely-selected women provided insights into social norms and expectations around postpartum abstinence, spacing, and contraception.

Results: Of the 4,678 women recruited to the prospective family planning study, 442 delivered an infant during the observation period. 28.4% of women had used a modern method of contraception within six months of delivery. Little method-switching was observed. Although there is evidence that postpartum abstinence was practiced in the area, 46.9% of women interviewed 3-6 months after delivery reported they had sex in the last month, and 50.0% of these women reported not using contraception. In-depth interviews suggested that “shame” associated with poor child-spacing put pressure on women to space their children.

Discussion: There was low uptake of postpartum contraception. Although some women observed a period of postpartum abstinence, and despite cultural norms that encourage spacing of children, a significant proportion of postpartum women were sexually active and reported not using modern methods of contraception. Targeting of contraception services to postpartum women is recommended.

8.2.2 Background

Women who have recently given birth are easily targeted for family planning education and engagement with family planning providers because often they are already connected with health professionals[169, 170]. Accessibility to voluntary contraceptive services has a direct impact on reproductive health outcomes, and uptake is thought to be indirectly associated with improvements in health, and socio-economic outcomes[21-23, 26]. Women in Malawi bear on average 5.7 children, and many pregnancies are unintended or occur sooner than desired. Although 42% of married women report using modern methods of contraception in cross-sectional surveys – higher than neighbouring countries – the total fertility rate (TFR) remains high and 26% of women are estimated to have an unmet need for contraception for either spacing or limiting births [1].

Postpartum contraception and postpartum abstinence

The postpartum period refers to the time from delivering a baby until menses start again, which varies among women, and is difficult to measure precisely. Some researchers refer to the extended postpartum period, which is the first year after birth[171, 172]. This one-year postpartum period is important for the welfare of mother and child, and complex in terms of fertility determinants: sexual activity, breastfeeding, amenorrhea, postpartum reduced fecundity, and use of contraception may all change rapidly[31, 173]. Typically a large proportion of postpartum women do not wish to become pregnant again soon after delivering an infant, but many women in sub-Saharan Africa do not use contraception during this time[171]. Sexually active women whose fecundity has returned are at risk of unintended pregnancy. Postpartum contraceptive programmes are cost-effective because in Malawi, women are expected to contact health services either for themselves or their infant, during the first nine months after delivery, so are easily targeted.

According to an analysis of the proximate determinants of fertility in Malawi for 1992-2004, postpartum infecundity was found to be the dominant determinant, but the biggest change in the proximate determinants over the time period was in contraceptive use[174].

Postpartum abstinence (PPA) in Malawi is a traditional means to space births, and in northern Malawi traditions are strengthened because women are considered to be “polluted” after delivering a baby until menses have returned[48]. Among Malawian women currently pregnant at antenatal clinics (ANC) responding to enquiries regarding their previous birth, the median length of PPA is estimated to be 5.8 months[48]. However, it appears that the duration of PPA in Malawi has been decreasing, in the context of the HIV epidemic as women may be concerned their husbands would stray[175]. A more recent estimate by the demographic and health survey using cross-sectional data estimates the median duration of postpartum abstinence to be 4.6 months in Malawi overall, 4.9 months for the northern region, 3.1 in the central region, and 6.5 in the southern region[1]. Another study found that northern Malawi has longer PPA than other regions (17 months in northern Malawi compared to 10 months in the south, and 7 months in the central region, in 1998)[176].

Two clinical trials of HIV-infected women to prevent mother-to-child-transmission (PMTCT) in Blantyre (southern Malawi), found that the median time to the resumption of sexual activity post partum was 6.6 months and 8.9 months respectively, (although the longer duration of PPA may be associated with being HIV positive)[177]. Multivariate analysis showed that early resumption of sexual activity postpartum was associated with socio-demographic factors including being married[177].

Breastfeeding lengthens postpartum amenorrhoea and reduces the risk of pregnancy[178], but if breastfeeding is not exclusive, then the protective benefits decline. There is still a risk of pregnancy prior to return of menses. The median duration of amenorrhoea is 10.5 months, and has been found to be shorter among women in the northern region (9.8 months), younger women, women living in urban areas, and those with higher levels of education[1]. The median time to resumption of regular menses in breastfeeding

HIV-infected women who participated in the PMTCT study was 9 months, consistent with other studies[179], and longer than the median time to resumption of sexual activity in the same study[177].

An analysis of Demographic and Health Surveys from 17 countries (including Malawi) found that the return of menses, breastfeeding status, and postpartum duration are associated with a return to sexual activity for postpartum women in ten out of the 17 countries, but not consistently associated with contraceptive use. Only the timing of the return of menses was associated with uptake of contraception, suggesting the importance of education about risk of pregnancy prior to menses return[180].

Sources of contraception data

Data on contraception come from a variety of sources such as routine data collected at health facilities, cross-sectional surveys, or retrospective surveys amongst which the Demographic and Health Survey (DHS) has developed sophisticated measurement tools such as the self-reported calendar method. Cross-sectional surveys may be prone to over-reporting, in the case where a woman considers herself to be a contraception-user and reports herself as such, even if she is not using consistently. Contraceptive calendars retrospectively record a woman's contraceptive status (and method), pregnancies, births, breastfeeding and terminations every calendar month for the five years prior to interview. These data do not suffer from problems of loss to follow-up, although there is selection bias as only women surviving to interview can report, and there are likely to be memory recall issues. These conventional estimates do not examine prospective time to uptake of contraception, which requires different methods for collecting contraception data, and these may capture time to uptake of contraception after delivering an infant more reliably.

8.2.3 Study setting and Methods

Study setting

The Karonga Prevention Study (KPS) operates a demographic surveillance site (DSS) in northern rural Malawi, where all births, deaths and migrations are recorded. At the end of 2012, 36,524 individuals were under observation[45]. The median age of first marriage is 18, and the onset of childbearing is early, with 90% of all 20-24 year old women having at least one child[36]. The community is patrilineal[48], and 15% of men and 27% of women are in a polygamous marriage[49].

A range of contraceptive methods are provided in the DSS area through different mechanisms (public, private, clinic, outreach) and service providers (Clinical Officers, Nurses, Medical Assistants, Health Surveillance Assistants (HSA), and volunteer Community Based Distribution Agents (CBDA)). Both KPS (2008-2009) and DHS (2010) estimate the contraceptive prevalence rate (CPR) at 45% (including condoms) in Karonga, using cross-sectional data [1, 36]. 12.1% of married women are estimated to have a tubal ligation.

Family planning data

Family planning (FP) cards were offered to all women age 15-49 living in the KPS DSS, between Jan-April 2012. The FP card was attached to the woman's health passport (paper medical record) and the woman was asked to keep her FP card carefully for one year. All 132 health care providers working in the study catchment area were trained to record information on the FP cards, whenever they provided contraception to a woman who was holding a card. Multiple refresher trainings were conducted, mobile phone air-time was provided, and motivational text messages were sent to all health care providers, to keep them engaged[164].

After one year, the FP cards were collected by KPS. Any missing contraceptive episodes were completed on the card by the KPS field team, by checking the health passports, and also asking women to report on their contraceptive use over the previous year. 87% of the data were collected in the prospective format (in the form of written reports by service providers) but gaps in data were filled in retrospectively (from the women's reports), achieving a more complete and accurate longitudinal dataset than would be possible using traditional survey methods. Informed written consent was taken from the study participants upon collection of the FP cards.

Additional data

Age and distance to road were derived from the DSS database. Population-based HIV sero-surveys, socio-economic surveys and adult sexual behaviour surveys contributed information on HIV, educational level, marital status and prospective fertility intentions, in order to explore explanatory variables for postpartum contraceptive use. The time-varying covariates (e.g. HIV, marital status and fertility intentions) refer to the status provided most recently when the woman received the FP card, and were considered unknown if recorded more than two years prior to receiving the card.

The proportion of women who resumed sexual activities after childbirth was estimated using data from the last round of the population-based adult sexual behaviour survey amongst women aged 15-49 in 2010-2011, using the question "Have you had sex in the last month?". A cross-sectional self-report on modern contraception use from the same survey also served to provide an understanding of the risk and exposure to pregnancy among postpartum women. (These cross-sectional data were not capable of estimating time to uptake of contraception, which is why the prospective longitudinal family planning dataset is so useful).

In-depth interviews carried out with nineteen purposely selected women in 2013 as part of a separate study on reasons for contraceptive choices and changes[157], provide

some insights into the social norms and expectations around postpartum abstinence and contraception.

Analysis methods

The new prospective longitudinal family planning data were linked to the KPS database, and Stata 12 was used to analyse the data. Analysis was restricted to women who delivered a baby (as recorded in the DSS database) between the date she received the FP card and 31 October 2012. Single failure per subject survival analysis was used to examine time to uptake of contraception following delivery. Uptake of contraception within six months of delivery was examined, because this is a time when women typically become more at risk of pregnancy (exclusive breastfeeding and post-partum abstinence tend to conclude). Ever-use (during the study year) of condoms was recorded, but episodes of condom-use were not identified individually, so this analysis focuses on uptake of modern methods of contraception excluding condoms.

Ethics statement

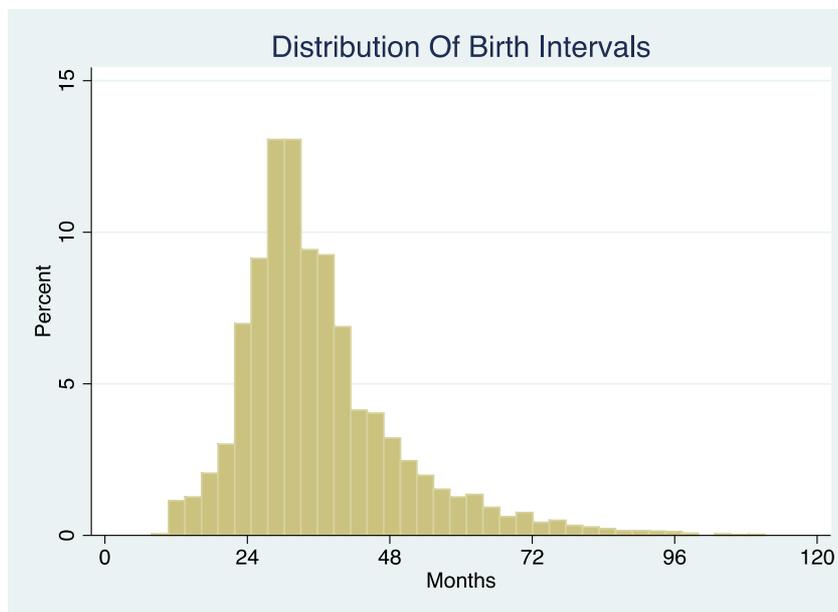
Ethics approval for the family planning study and the qualitative study was received from the College of Medicine Research and Ethics Committee, Malawi, and the ethics committee at the London School of Hygiene and Tropical Medicine (LSHTM), UK. Ethics approval for the DSS, HIV sero-surveys, socio-economic survey and adult sexual behaviour was in place from the National Health and Sciences Research Council Malawi, and LSHTM ethics committee.

8.2.4 Results

Background data from DSS

Using birth data from the DSS, the length of birth interval was calculated for women who delivered two or more children in the DSS area. The median birth interval is 37 months, and 11% of births are estimated to have occurred less than 24 months after the previous birth (Figure 8.1). However, the 11% figure should be considered the very minimum, as the DSS does not observe births that occurred outside the study area if the woman out-migrated. It was estimated that 92.0% of deliveries to women in the DSS in 2010 took place in a health facility rather than at home, and 13.9% took place in the district hospital in Karonga town, demonstrating a relatively high level of institutional deliveries.

Figure 8.1 Time between delivery of child and delivery of the next child



Study Participants

Of 7,393 women aged 15-49 who were eligible to participate in the family planning study, 4,678 (63.3%) both received and submitted a FP card at the end of the year. Of these,

442 women (9.4%) delivered a baby after receiving their FP card (early 2012), and before 31 October 2012. Of the 2,715 eligible women who were *not* family planning study participants, 166 (6.1%) delivered a baby during the same time period.

The average observation time from delivering a baby to exiting the study was 270 days (s.d. 72.3, range 129-407). There were 253 person-years time at risk. No woman delivered more than once during the observation period. Of women who *did* use contraception, Table 8.1 presents the first contraception method that was used after delivery. The majority of postpartum contraceptive users (59.8%) initiated with injectables. The method-mix, and contraceptive prevalence rate using DHS Karonga District data is presented for background.

Table 8.1 Method-mix for married women who did use contraception after delivering a baby within study period, compared to DHS figures (excluding condoms)

Method	Number of women who started the method	Method mix (%) for postpartum contraceptive users	Method-mix (%) DHS, Karonga District*	Contraceptive prevalence rate (DHS, Karonga District *) %
Tubal ligation	12	7.1	33.2	12.1
Implant	35	20.7	8.8	3.2
IUD	0	0.0	0.0	0.0
Injectables	101	59.8	54.5	19.9
Oral contraceptive pill	21	12.4	3.6	1.3
Total	169	100.0	100.0	36.5

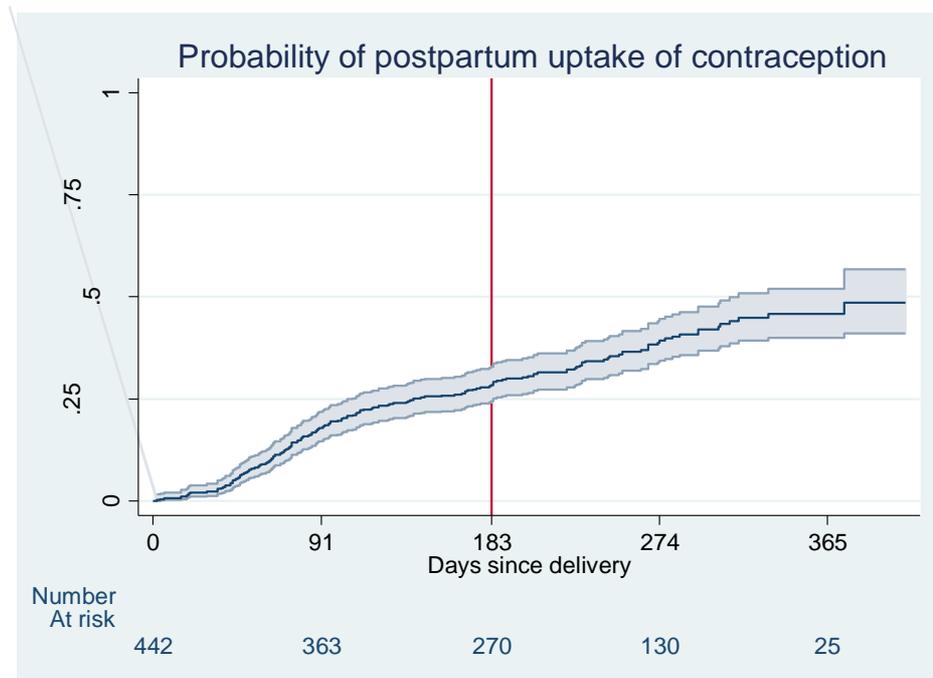
* According to cross-sectional data for Karonga District, Demographic and Health Survey, for comparison. Note this population is all married women contraceptive users, not restricted to postpartum women.

Time to uptake of contraception

Figure 8.2 shows the Kaplan-Meier estimated “failure” curve (with 95% confidence interval) from time of delivering a baby to uptake of contraception. The number of women still at risk is presented at three, six, nine and twelve months respectively. 28.4% of women had used a modern method of contraception by six months (183 days) of delivering a baby. By 365 days, 45.8% had used a modern method of contraception. A handful of tubal ligations and implant procedures were performed within the “immediate” (first six weeks)

postpartum period: three tubal ligations were performed within one week of delivering a baby, one tubal ligation at three weeks, and two implants were inserted at two weeks and five weeks respectively.

Figure 8.2 Probability of postpartum uptake of contraception



Profile of postpartum contraceptive users

Women who successfully managed to use a modern method of contraception within 6 months were compared with women who did not (Table 8.2). Married women, women who attained higher levels of education, and women who lived within 1km of a road were more likely to have used contraception within 6 months, although this failed to reach statistical significance. Women who had previously reported wanting no more children were slightly more likely to use contraception by six months (26.8%), than women who previously reported wanting a child within two years (21.1%).

Table 8.2 Profile of women who started contraception within 6 months compared to women who did not start using contraception within 6 months (excludes women who were not observed for at least 6 months)

	Started contraception within 6 months		Did not start contraception within 6 months		Total	χ^2 test ^a
Mean age	26.0		26.7		26.5	p=0.27 ^b
	N	%	N	%	N (%)	
Marital status						p=0.08
Currently married	117	32.7	241	67.3	358 (100%)	
Separated/ widowed/ divorced	2	10.5	17	89.5	19 (100%)	
Never married	3	20.0	12	80.0	15 (100%)	
Education						p=0.09
Incomplete primary	3	13.0	20	87.0	23 (100%)	
Complete primary	70	30.3	161	69.7	231 (100%)	
Secondary+	49	35.5	89	64.5	138 (100%)	
HIV status						p=0.71
HIV positive	4	26.7	11	73.3	15 (100%)	
HIV negative	109	31.2	240	68.8	349 (100%)	
Parity						p=0.64
None	4	30.8	9	69.2	13 (100%)	
1-4	73	29.8	172	70.2	245 (100%)	
5+	23	35.9	41	64.1	64 (100%)	
Fertility intention						p=0.05
No more	15	26.8	41	73.2	56 (100%)	
Wait 2+ years	51	38.1	83	61.9	134 (100%)	
Want within 2 years	19	21.1	71	78.9	90 (100%)	
Unsure	5	23.8	16	76.2	21 (100%)	
Distance to road						p=0.16
Less than 1km	60	35.1	111	64.9	171 (100%)	
More than 1km	63	28.4	159	71.6	222 (100%)	

^a p-values from χ^2 testing difference between “did start contraception within 6 months” and “did not start contraception within 6 months of delivering”

^b two-sample t test, testing difference between means

Method switching

Of the 169 women who did use a modern method of contraception at any time after delivering, just five used more than one method during the course of the observation period: three started with injectables and switched to an implant, and two used both injectables and OCP.

Postpartum abstinence

Presumably not all women were sexually active, and hence would not need contraception. Some did not have partners and therefore had limited opportunity for sexual intercourse. Meanwhile other women were practicing lengthy periods of postpartum abstinence. Regardless of the reasons for resumption (or not) of sexual activities and bearing in mind the culture of postpartum abstinence, use of postpartum contraception was analysed against a denominator of postpartum women who were sexually active.

A separate analysis was conducted using additional data from the DSS on births, as well as data from the 2010-2011 population adult sexual behaviour survey which included the question “Have you had sex in the last month?” and a cross-sectional question on whether a woman reported currently using contraception. These women were sampled from the same population as those from the previous analysis using FP card data. 872 women in the adult sexual behaviour survey who delivered a baby between 0-365 days prior to an interview were included in this analysis. It was assumed that the woman had not had sex at any time since delivery if she reported no sex in the last month. If a woman responded positively that she had sex in the last month, it was known that she had resumed sexual activity, although the date of resumption was unknown. It was not possible to estimate the average length of postpartum abstinence using these data, as the survey was not designed for this purpose.

Table 8.3 shows that the proportion of women who had sex in the last month increased steadily with time since delivery, showing that sex in the last month is a credible proxy for the resumption of sexual activity following delivery, which logically must increase over time. For women interviewed between 0-3 months since delivery who had sex in the last month, 67.9% reported they were not currently using contraception (although note the small sample of 56). This decreased to 50.0% of women interviewed between 3-6 months since delivery who had sex in the last month. These additional findings demonstrate that although there is evidence that postpartum abstinence is practiced in the area, nevertheless

there is a significant proportion of postpartum women who are sexually active, and report not using modern methods of contraception.

Table 8.3 Women who have resumed sexual activities, and proportion of women who are not using modern contraception, by time since delivery.

Time since delivery	Women who had sex in the last month N (%)	Of those who had sex in the last month, women who self-report they are <i>not</i> currently using contraception N (%)
0-3 months	56 (28.1%)	38 (67.9%)
3-6 months	106 (46.9%)	53 (50.0%)
6-9 months	101 (48.8%)	37 (36.6%)
9-12 months	128 (57.7%)	45 (35.2%)

The child of “*chiwulila*” (unplanned pregnancy soon after the previous child)

As a result of on-going communication messages from government and health care providers emphasizing the importance of child-spacing, there has been pressure on women to ensure they leave an adequate gap between children. A 27-year old woman in a polygamous marriage with three children explains why she believes it’s important to space her children, and although her husband refuses to allow her to use contraception (they intermittently use condoms), she does use OCP and injections covertly:

“My husband refuses saying ‘no family planning... We need to use condoms only’. I just do these family planning methods on my own, because I cannot carry more children on my back. I end up staying without bathing or looking smart. So I do (family planning)... according to my own power, so that the young child can grow well without being tormented. Otherwise I can end up becoming pregnant and bear another child without planning. This can make the already born child not to grow well, so as women we do this secretly.”

The cultural practice of postpartum abstinence is reinforced by the stigma associated with poor child-spacing, and the burden of shame tends to fall predominantly on the woman. A 24-year old woman who has two children, describes how she would be ostracised if she

had a child too soon after a previous one. Although this woman was not in the postpartum period during the quantitative study and so her postpartum contraceptive use is unknown, she is nevertheless a consistent contraception user, as the stakes of having another pregnancy were too high for her.

“The first to encourage me (to use family planning) was my mother-in-law... She used to tell us that she won’t visit us if we bear children without spacing... If someone having a young child becomes pregnant, people stop paying visits to the house, and they can’t even ask for water to drink, because you have given birth to another child without spacing... They say that it’s a pregnancy for ‘chiwulila’ (unplanned pregnancy soon after having a previous child), so they become scared that they can get body swellings. It can’t be a good thing for people to stop visiting the house... It will be only I being pregnant at that time, the child of ‘chiwulila’, and my husband who will be staying at that house (with no visitors).”

She goes on to explain that part of the reason for the shame associated with poor child-spacing is that it shows to the public that the couple is not practicing postpartum abstinence, and that the man is being restrained from seeking extra-marital partners:

“Ah, men are troublesome, they know that even if they can bear a child without spacing, they don’t stay at home for a long time. Since it’s the wife who stays at home most of the times, many people laugh at the wife a lot. They say that the bearing of children without spacing has come about because the wife was refusing the husband from going anywhere else (to meet with other women). So I didn’t want people to laugh at me”.

A 33-year old woman with four children who has never used modern methods of contraception, describes how the practice of postpartum abstinence is rarer today than it was in her mother’s time:

“She (my mother) explained that ‘In our time when we had a baby ... The husband could have his own room and the woman her own room’. That’s how she explained, but this can’t happen at present.”

The respondent also explains that she does not consider herself to be at risk of pregnancy after having a baby, and so does not see the need to use contraception, if it would only delay her fertility for even longer. This is a powerful concern in a context of high fertility norms, where infertility is not tolerated, and so is a barrier to contraception use for this woman:

“I have been hearing about family planning that there is injection, but for me I take time to start my menstruation cycle from the time I give birth. Sometimes... a year and some months, so I thought that if I use contraception, I could have some problems (getting pregnant).”

8.2.5 Discussion

There was relatively poor uptake of contraception after childbirth. This is despite women in ANC, post-partum clinics and vaccination clinics receiving intensive education messages on birth spacing. There was no group of women that were significantly more effective at initiating contraception within six months, although there was weak evidence that married, educated, and women who previously reported wanting to wait at least two years, were more likely to use contraception within six months. For postpartum women who used contraception, very little contraceptive-switching was observed (but note the brief follow-up period), although when switching did occur this was typically to longer-acting methods. Women who were pregnant or delivered babies were not under-represented in this family planning study, although bias could have been introduced if non-study participants’ contraceptive behaviour was in some way different to study participants’ behaviour.

There is now an abundance of evidence suggesting longer birth intervals have beneficial health outcomes for mother and child[26, 181-183]. It was estimated using the DSS data that 11% of births occurred less than 24 months apart. For comparison, the Malawi DHS estimates the median birth interval to be 36 months, and 15% of births to occur less than 24 months apart[1], which is in line with estimates from Tanzania, Zambia, and Mozambique, but otherwise relatively low compared to other countries in the region[163], demonstrating that the majority of children were in fact relatively well spaced. Therefore, services should be strengthened to encourage the few women who are at risk of experiencing birth intervals of less than 24 months to use contraception, and they would need to be identified beforehand.

The lack of data on amenorrhea was a limitation in both datasets, since conception risks in the first six months postpartum are small for women experiencing amenorrhea, regardless of whether or not they are exclusively breastfeeding. Nevertheless qualitative data revealed that some women believe they are not at risk of pregnancy for up to a year after delivering the previous child. Data from the adult sexual behaviour survey in the DSS, suggests that a significant proportion of women resumed sexual activities in the postpartum period, and yet reported not using contraception, although they may have been relying on traditional methods. We assumed that women had not had sex at any time since delivery if she reported no sex in the last month, and this was a limitation and ultimately underestimated the proportion of women who had resumed sexual activities. This is worrying, as it suggests a large number of women were at risk of another pregnancy soon after delivery – which is frowned upon in Tumbuka culture, and is not advisable for health reasons. For those women who have ended the period of post-partum abstinence before a culturally acceptable time, using contraception could be seen by the community as proof that she and her husband are not observing the abstinence traditions and are bringing “shame” upon themselves. This might deter women from starting to use contraception. Providing contraception services to postpartum women in a confidential manner is recommended.

Limitations to the family planning study include limited follow-up time due to restrictions in time and resources. It would have been interesting to explore uptake of contraception for a longer period after delivery. Male-controlled methods of contraception were underestimated using this method of data collection. Vasectomy is very rare in Karonga District (0.0%)[1]. Condom use is estimated at 8.8% by the 2010 DHS[1], however evidence from the qualitative interviews suggest condoms are used sporadically and inconsistently and the woman does not always have control over whether they are used[157].

There is very little specific guidance on providing family planning in the postpartum period in Malawi. For example, there are no key indicators related to postpartum family planning in Ministry of Health guidelines on related issues such as maternal morbidity and mortality, or reproductive health, beyond simply stating that family planning should be integrated with other services[159, 160, 184, 185]. Nevertheless, it has been observed that women must either be menstruating or provide proof of non-pregnancy to service providers before receiving contraception, such as injectables. Clearer guidance is needed for health care providers, on the services they could promote to provide a more holistic service to postpartum women. Previous research on HIV positive women argued that consistent contraceptive counselling and messages in the post-partum period is a good way to achieve high contraceptive use[79].

Only a handful of women received a long-acting or permanent method of contraception very soon after delivering their baby. Given a large proportion of deliveries now take place at health facilities (92%), this provides an opportunity for health care providers to either counsel women on their family planning options before they return home (perhaps providing a date by when the woman should return to the health facility to start contraception), or indeed to provide a service such as an implant or IUD insertion. There is significant evidence that IUDs can safely be inserted immediately after delivery[186, 187]. IUDs are not commonly used in sub-Saharan Africa, but have great potential given they are effective, long-acting, reversible, and cost-effective[143, 188]. Not all health facilities offer long-acting methods of family planning on a daily basis. Many facilities offer services once

a month as part of out-reach services provided by the NGO Banja La Mtsogolo, a partner of Marie Stopes International. Therefore, the opportunity for women who delivered at a health facility to start using a long-acting method of contraception within a few days of delivery would depend on the visiting schedule of Banja La Mtsogolo. Ultimately, services should enable the few women who are not spacing their children as they would want, to do so.

END OF RESEARCH PAPER

8.3 Abstinence

Some women do not use contraception because they do not need it, as they are not sexually active. This could be because they are not in a sexual union, or they are practicing abstinence. Data on sexual activity was not collected as part of the family planning card study (Chapter 5, 6, 8). No specific question on postpartum abstinence was asked in the KPS multi-round sexual behaviour survey. However, the issue of abstinence did come up in some of the qualitative in-depth interviews (Chapter 7), from women who described periods of postpartum abstinence. The role of abstinence is an area that could be better explored.

8.4 Additional Findings

One 28 year old woman who had five children with her husband and had previously intermittently used injections, described how her husband had agreed to her using contraception, despite both her own mother and her mother-in-law disapproving, and in fact he protected from his own mother his wife's secret that she had used injections. She describes the reaction of her husband to her poor health status:

“He was the one encouraging me while we were at Mzuzu that I should close the tubes (tubal ligation). And when I went to Karonga to deliver the baby, he said that ‘After you give birth you should close the tubes’.” (IDI03)

This is further evidence of the potential for intervention of family planning counselling and/or provision after the birth of a child, as some parents are already thinking about preventing another pregnancy.

8.5 Summary

This paper revealed that there is relatively poor uptake of postpartum contraception and these women are potentially at risk of pregnancy. It revealed the societal pressures to space children, and the shame associated with poor child-spacing. Since 11% of births occur less than 24 months after the previous child, an appreciable minority of women experience short birth intervals, and many more are at risk through unprotected sexual activity in the post-partum year. It would be useful for family planning programmes to target postpartum women who are not yet ready to have another child. Programmes should protect the confidentiality of the women, because use of contraception might be seen as proof that a postpartum woman has resumed sexually activity, which is socially problematic for some women.

Postpartum women who are not yet using contraception may in part be contributing to the high level of fertility in Malawi. Women of this profile in this stage of their reproductive lives contribute a disproportionately high number of births as they are fertile, sexually active, and not yet using contraception. However, if all short birth intervals were eliminated, overall fertility would fall by less than 11% as this would represent postponement rather than cessation of childbearing.

Section III: Summary and Conclusion

9 Discussion

This final chapter summarises the main results, and draws together the findings from Chapters 4-8 in relation to the study aims and objectives as set out in Chapter 2 and repeated here:

Aim: To examine the complex relationship between fertility intentions, contraception, and births, using a combination of:

- a) Existing data on fertility intentions and births captured by the KPS Demographic Surveillance Site;
- b) Innovative quantitative methods to collect contraception data using patient-held records; and
- c) Qualitative methods.

Objectives:

1. To explore whether women operationalize their fertility intentions and achieve their reproductive goals
2. To examine the extent to which women use contraception consistently
3. To understand reasons for contraceptive choices and changes.

This chapter discusses the findings in relation to the puzzle that was originally set out in Chapter 1: *why fertility remains high in Malawi despite high contraceptive use*. Implications for the way contraception data are collected, and suggestions for service delivery and policy are discussed. Issues of limitations and generalizability are examined,

and areas for future research are proposed. A summary of plans for dissemination of results is also presented.

9.1 The role of fertility intentions

A secondary analysis of data on fertility intentions was presented in Chapter 4. Women expressed desires and intentions to control their fertility, but this did not translate very strongly into fertility outcomes. Women who wanted no more children were less likely to have a subsequent birth than women who did want more children (11.9% and 46.5% respectively conceived within two years). This validates the analytical approach and the value of the fertility intentions data, and shows that women are operationalizing their fertility intentions to an extent. However, a significant proportion of women who reported they want no more children went on to conceive. Either their fertility intentions changed rapidly, or these conceptions were unintended at the time. These findings demonstrate the existence of unmet need for family planning. They may also demonstrate the lack of concreteness of fertility intentions in this culture.

Fertility intentions changed between surveys, and some of these changes could be accounted for by changes in family circumstances such as marital status or the birth of another child (Chapter 4), which has also been found in other work[117, 148].

9.2 The role of contraception

Using data from the multi-round sexual behaviour survey, women using short-term methods – condoms, OCP and injections – experienced a significant number of conceptions (Chapter 4). This is likely to be due to a combination of over-reporting of contraceptive use in self-reported surveys, and high discontinuation of short-term methods. This was an important finding, as injectables are the most commonly used method of contraception in Malawi. Given that women who report using injectables still experience a significant

number of conceptions, they must be a contributing group to the high fertility in Malawi. Many women use injectables, but the evidence suggests that a high proportion stop using and then get pregnant. For those women who are not ready to get pregnant, reasons for discontinuation need to be addressed. Long-acting methods were more effective at reducing conceptions, and so these should be promoted for women who wish to delay or stop getting pregnant[143, 188].

The analysis showed that both fertility intentions and contraceptive use are important determinants of conceptions, but are not accurate predictors. Contraception reduced conceptions only if it was used consistently. A strong desire to have smaller families (as opposed to spacing births) was associated with more effective use of contraception, but women who did not desire more children could also achieve this through the traditional practice of abstinence.

Quantitative and qualitative research methods provided further evidence that women use contraception inconsistently (Chapters 6 & 7). High discontinuation rates of OCP and injections were described in Chapter 6, using family planning card study data. No one group of women were any better able to adhere to short-term methods than any other group. The implications of this are that interventions to assist women to use contraception continuously do not need to be targeted at specific sub-groups. Ali and Cleland (2010) also found that education had little effect on discontinuation[87]. Very little method-switching was observed during the one-year quantitative study, although this was a relatively short follow-up period. However, it has been shown elsewhere that method-switching is unlikely to occur after three months of discontinuation[87]. Furthermore, other researchers have also found that switching is relatively low in Malawi[89]. Women tended to report ever-use of higher numbers of methods in the qualitative interviews (Chapter 7). The in-depth interviews also revealed that women use contraception haphazardly and tend to view themselves as contraceptive users even if they are not using it effectively.

A large proportion of provider-woman contacts for family planning is the provision of injectables at the community level by HSAs (either at outreach clinics, or at the homes of

the provider or the woman). Much has been written about community-based provision of services[53, 61, 167], and strategies to improve this model should be explored, to assist women to use contraception continuously without gaps. However, proximity to contraceptive services did not appear to be a predictor of continuity of use. This is in keeping with previous research in Malawi, which found no relationship between proximity to services and general contraceptive use[63, 64].

There was poor uptake of contraception in the postpartum period (Chapter 8), which suggests these women are at risk of pregnancy, which would result in poor birth spacing. Although postpartum abstinence is a common cultural practice, nearly half of women who were interviewed at 3-6 months since delivery had resumed sexual activities, and 50% of these were not using contraception. This is worrying, as it suggests a large number of women were at risk of another pregnancy soon after delivery – which is frowned upon in Tumbuka culture[48], and is not advisable for health reasons[181].

9.3 So why is fertility so high in Malawi?

The high discontinuation of short-term methods (Chapter 6) inevitably has an impact on fertility[84, 93]. Women use contraceptive inconsistently, although they often consider themselves to be contraception users (Chapter 7). Discontinuation was likely to be a contributing reason for the high number of conceptions by women who reported they were using short-term contraception, as seen in Chapter 4.

For the purposes of describing consistent contraceptive behaviour, a new term was coined in this thesis: the *actual CPR*. The *actual CPR* is a refinement of the traditional measure to allow for over-reporting of contraceptive use, and to take account of discontinuation and gaps in use. The *actual CPR* does not rely on self-reported contraceptive use, but rather on prospective provider-recorded data at the time of service provision. The *actual CPR* (35.1%) was found to be lower than the conventional cross-sectional estimate by 1.6% excluding condoms. The conventional estimates of CPR over-estimate actual use of

contraception, and lead to a false expectation of pronounced fertility impact.

Today in Malawi family planning is less controversial than it has been in the past, and this was reflected in the in-depth interviews. In the past, contraceptive users may have been more likely to deny their use of contraception out of embarrassment, particularly if they thought relatives or neighbours were eavesdropping on an interview. It is therefore possible that the 7% CPR reported in Malawi in 1992 may have been an underestimate. As family planning has become more accepted, and the discussion and sharing of matters relating to sex has become more common (particularly due to the HIV epidemic), it is less likely that contraceptive users would deny using family planning. Some of the increase in CPR over the last 20 years might partly be attributable to women being more willing to “admit” and discuss their contraceptive use with strangers, exaggerating the genuine increase in CPR. Alternatively, perhaps women have been replacing relatively effective non-modern methods (e.g. abstinence, calendar, withdrawal) with modern-methods, but there have been few new-adopters of any method of contraception (modern or non-modern).

KPS does not have data on abortions in the DSS study area, nor are there data available that could be used as a proxy (e.g. obstetric complications). Abortions are probably very rare in the study area. The lack of safe abortion as an approach to limit births may also contribute to high fertility in Malawi. In countries where abortion is more liberal (e.g. Ethiopia and Ghana), it is likely that abortion plays a greater role in reducing fertility[189], although it is difficult to claim this with confidence, as abortion figures are largely based on guesswork and modelling.

It is common for pregnancies and births to occur outside of marriage in Malawi (Chapter 4). In the northern region in particular, there is little stigma associated with extra-marital fertility[48]. The lack of stigma could be a factor in explaining high fertility if “shame” is not a deterrent to being pregnant outside marriage. The contraceptive prevalence rate is usually presented only for currently married women (42.2% in Malawi[1]). If contraceptive use is lower amongst unmarried women and yet these unmarried women also contribute many births, this could be a factor in explaining why fertility is high in relations

to the CPR estimate. The CPR for sexually active unmarried women in Malawi is 46.3%[1], slightly higher than for married women. However, the method mix for sexually active unmarried women is dominated by short-term, less effective methods: 23.0% of sexually active unmarried women report using condoms (unsurprising if they are only intermittently sexually active and this is also seen in other parts of Africa[163]), and 15.4% report using injectables. It is also likely that sexual activity would be under-reported by young unmarried women, even if they do not deny and are not ashamed of pregnancy.

As described in Chapter 8, birth intervals in this population are not particularly short. Only 11% of births occurred less than 24 months apart, which is comparable to DHS and other estimates[1, 182]. Births that occurred soon after a previous birth – a failure of birth spacing – are an additional contributing factor to high fertility, and there was also poor uptake of postpartum contraception.

True contraceptive-failures were not examined in this thesis. Pregnancy rates are much higher than would be expected based on typical method failure rates measured elsewhere[190, 191].

A summary of key findings is presented in Box 1.

9.4 Implications for the collection of contraception data

A new method for collecting contraception data was presented that is not prone to over-reporting, or recall bias, and has the potential to be more reliable (the family planning card study, Chapter 5). The new method allowed for an exploration of the *actual CPR*, and contraceptive switching and discontinuation (Chapter 6). A DSS provided the sampling frame for participants, and enabled the new contraceptive data to be linked to the KPS database, and thereby allowed an exploration of other related variables.

The new method could also be used to collect prospective contraception data outside of a DSS setting. However, sampling of study participants would need further consideration – this could take place during DHS surveys, giving a nationally representative sample.

Researchers may also wish to collect additional information on the profile of the study participants at the time of recruitment. Techniques aimed at reducing under-reporting and mis-reporting of contraception data would need to be implemented. These may include refresher trainings of health care providers involved in data collection, reminder SMS messages, or financial incentives. Some of the new health passports in Malawi have a section in it akin to the family planning card, which allow for the recording of OCP and injectables. With the right training of service providers to fill this correctly, a periodic sampling of these cards would also provide longitudinal contraception data.

Alternatively, if conventional methods for calculating CPR are to be continued, the work in this thesis has shown that improvements could be made. For example, if a woman has responded positively in a survey that she is currently using injectables, additional probes regarding when she last used that method should be added to the questionnaire. For example: “When was the date of your last injection?” and “When is your next injection due?”. These techniques would help to identify over-reporting and gaps in use, with the aim of getting closer to the *actual CPR*.

The qualitative study (Chapter 7) used retrospective contraceptive calendars as a tool to assist women to recall their contraceptive use when describing their past experiences in in-depth interviews. However, the study participants found it difficult to accurately recall their contraceptive use from the previous 12 months, let alone the past 5 years. Moreover, there were several instances of discrepancies between what was recorded by the health care provider on the woman’s health passport and family planning card, and what the woman self-reported retrospectively. This has implications for the way data from retrospective contraceptive calendars are interpreted. Retrospective data from contraceptive calendars are likely to be unreliable for identifying gaps of non-use, which are critical for providing an understanding of discontinuation and risk of pregnancy. Researchers and the DHS rely heavily on retrospective contraceptive calendars to collect data on switching and discontinuation, and the findings from this thesis suggest this might be unreliable.

Alternative methods that collect prospective data – such as the one described in Chapters 5

& 6 – are likely to be more accurate.

9.5 Routine contraceptive data

For providing care to the client, there are lessons for the way routine data are collected. It should be ensured that all health passports have a dedicated section on family planning. This has not yet been normalised in Malawi. Newer health passports have a family planning page, but these are not consistently available. Furthermore, the health passports that do have a family planning page do not clearly allow for a woman to switch methods, and the page tends only to be used for OCP and injectables. A review of the family planning section of the Malawi health passport is therefore recommended, so that it becomes possible to capture switches in methods.

Health care providers record the date of the next appointment in the health passport for women using injectables. There was some variation in the length of time to the date of next appointment. It was observed anecdotally that many of the dates were significantly earlier than 13 weeks. This might have been a strategy health care workers were using to encourage women not to be late for their next appointment. However, women who persistently had their follow-up injection too early represent a waste of resources (both health service and the time and transport costs for the woman), and there is risk of side-effects from over-dosing. Establishing how to calculate the date of next appointment, together with a re-training for health care providers is advisable.

Finally, there were occasions where retrospectively reported family planning services were recorded neither on the family planning card, nor in the health passport (Chapter 5 & 6). If record-keeping is not undertaken consistently, there are implications for the use of patient-held records by the subsequent health care provider in providing a continuous service, and for the researcher to measure continuity of care.

9.6 Condoms

It has been challenging to interpret the information on condom-use in this thesis. Conceptions were high amongst women who reported using condoms in the multi-round sexual behaviour survey, suggesting they were not used consistently (Chapter 4). The prospective family planning card study (Chapters 5, 6 and 8) did not systematically collect data on condom-purchase or provision. This was because: a) condoms can be purchased at shops, and procured by men, and so would be under-reported using the FP card method; b) collecting a condom does not mean it was used; c) there is no lingering contraceptive effect of a condom other than for one episode of sex; and d) they can be used with one partner but not another. In the Malawi context they are usually promoted for HIV prevention rather than contraception, and so they may have been used in addition to a more reliable method of contraception. Although it was not possible to conduct event-history analyses of condom-use, ever-use of condoms (during the study year) was reported at the time of collection of the family planning card.

In in-depth interviews, most women reported using condoms at some points in their lives (Chapter 7). However, they gave a sense that condom-use was generally haphazard, and not used with any consistency. Condom-use was also related to male power and control in the relationship, which has also been shown in other literature[62, 80-83]. Based on the additional comment on condoms presented in Chapter 6, it would be prudent to include probes on frequency and selectivity of use at the time of asking contraception questions, so as to interpret reports of current condom use.

9.7 Service delivery and policy recommendations

The skewed method-mix which heavily favours injectables and tubal ligations largely reflects cultural preferences and social norms. However, this could be indicative of service-delivery problems if it is due to a lack of access to alternative methods or provider-

bias mix[165], and this may partially be the case in rural Malawi. As expected, conceptions are rarer among women who use long-acting methods (Chapter 4). Furthermore, discontinuation of long-acting methods is rare, so periods of non-use which leave women exposed to pregnancy are reduced. Therefore, one of the key recommendations from this thesis is to counsel women who express a wish to delay or stop childbearing on the full range of long-acting methods, including implants and IUDs[143, 188]. This is to help identify a method suited to each woman, to avoid inconsistent use of short-term methods, and ultimately prevent unintended pregnancies. Women are also less likely to be inconvenienced by having to search for renewal or new supplies of short-term methods. There is evidence suggesting that IUDs can be safely inserted immediately after delivering a baby[186, 187] and so expanding provision of this service could be considered for post-partum family planning.

However, for many women, short-term methods will remain their method of choice. Provision of services is relatively good in this study area, with a range of facilities and community-based providers offering contraceptive services throughout the DSS area. Ali and colleagues argue that there is weak evidence that discontinuation can be reduced by higher quality services[89]. A systematic review of randomised controlled trials of intensive counselling techniques versus routine family planning counselling found no benefit of counselling strategies to improve adherence and continuation[94]. Similarly Curtis and co-workers find that underlying motivation to avoid pregnancy is an important factor in discontinuation, putting the onus on the woman[93]. Nevertheless, the provision of services could be strengthened in other ways, for example procurement systems could be improved to reduce stock-outs, and family planning clinic opening hours could be increased and confidentiality of services could be addressed. Health care providers should be retrained to counsel women on the importance of presenting on time for repeat visits. Clients need to be informed of the risks of presenting late, as many in-depth interview study participants did not consider themselves to be at risk of pregnancy (Chapter 7). For women who are dissatisfied with a method, health care providers should be re-trained to assist them in

identifying an alternative method, so users are enabled to becoming successful “switchers” rather than simply “discontinuers”. Further innovative counselling tools are being developed that incorporate theories of behaviour with reproductive and sexual health practice. These tools require evaluation, particularly for their impact on continuity of use[192, 193].

There are also lessons to be learned from related health fields that require repeat health care visits. For example, those trying to stop smoking can sign up to services that provide online and SMS text message encouragement and advice[194, 195]. Similar strategies – SMS text messages reminders to women who have a mobile phone – might work for encouraging adherence to family planning. The use of mobile technologies would deserve further exploration as to the potential impact[196, 197].

Antiretroviral therapy (ART) policy in Malawi recommends active follow-up for individuals who have defaulted[67]. The family planning community could learn from some of the techniques used for ART adherence (although it should be noted that there are good reasons for stopping use of family planning (not sexually active, or want a baby), but there are very few reasons to stop taking ART). For example, at the time of initiating a short-term method of contraception, consent could be sought from the women to actively follow her up (phone call, home visit) in the event that she is late for a repeat appointment. Community-level provision of contraception could be restructured so that community-providers are trained to remind women in their community to present for follow-up appointments. The implications for confidentiality in several of these strategies would need careful consideration, and this is an issue that ART reminders also have to contend with. Cooperation and shared learning between the two related health fields might be beneficial.

It is salient that 92.0% of deliveries occur in health facilities. This provides an opportunity for family planning uptake or counselling prior to the woman returning home, in the context of the cultural importance of postpartum abstinence (Chapters 7 & 8). Women may feel ashamed to use contraceptive services prior to an acceptable time, as using family planning is “proof” to the community that she is sexually active. Therefore, services must be confidential so that sexually active women who are not ready to become pregnant are

enabled to use contraceptive services, particularly in communities where postpartum abstinence is a common cultural practice. Long-acting methods could be presented as advance preparation for resumption of sexual activity, rather than an implication of current activity. There should also be clearer guidance for health care providers on the range of services to promote, to assist them to provide a holistic service to postpartum women[79].

Fear of potential side-effects emerged as a barrier to women initiating and maintaining use of contraception, even if they had not experienced such side-effects first hand. Myths that currently deter women from using contraception need to be dispelled[62]. In particular, hormonal users need to be reassured that the method will not affect their fertility in the long term, as this was a major reason for discontinuing (Chapter 7). Many papers emphasize the importance of counselling about side-effects, so that women are not deterred if they experience them [62, 74]. These papers also encourage counselling the woman to return to the health care provider to discuss alternative methods. The findings from this thesis support the latter recommendation to encourage women to seek advice from health care providers if they are experiencing side-effects that cannot be tolerated. However, it is not clear that a focus on counselling about potential side-effects should be encouraged. Women may attribute contraception as the cause for almost any change to their health or well-being (some of which may not have a clinical explanation), and women report stopping contraception because of this (Chapter 7). It could be argued instead, that counselling should focus on tolerating side-effects if they are manageable, and switching methods if they are not, particularly if the client has a supportive environment. The current focus on counselling about potential side-effects could intensify the impact of side-effects on discontinuation.

A considerable proportion of births are unplanned and (if earlier preferences are meaningful) unwelcome in this population (11.9% of women who want no more children have a(nother) child within two years). Becoming pregnant when a woman does not want to be pregnant can encompass a range of feelings from dread to inconvenience (Chapter 7). Women who feel the former should be given the opportunity to articulate this without shame. An IDI respondent described how her husband had suggested an abortion but she

was fearful of this. In Malawi, abortion is currently restricted[68]. Therefore, a review of the abortion laws in Malawi is recommended, in order to allow women who experience unintended pregnancies to terminate safely.

However, non-service provision interventions are also recommended that address the demand for family planning, and encourage women to *want* to use contraception continuously. Fostering is common in this community, and fosterage has been found elsewhere to promote pro-natal behaviour[4, 166]. Wanting no more children was associated with fewer conceptions (Chapter 4), demonstrating that desires to have smaller families does have some effect and can have an impact on fertility. Given that the government of Malawi is somewhat concerned by rapid population growth[57-60, 198], the potential of interventions aimed at addressing high fertility norms and encouraging families to *want* smaller families should be explored. Previous campaigns in Malawi have focused on the importance of child-spacing. These have been successful as women show general awareness of the benefits of spacing (Chapter 7). Exploration of mass media campaigns promoting the idea of smaller, healthier families is therefore recommended. Previous mass media communication to encourage contraceptive use has been moderately successful[66]. However current media campaigns on family planning in Malawi are often abstract and poorly targeted. Some bill-boards attempt to present the inter-linkages between population and environment, which are unlikely to communicate clearly to individuals and couples' motivations. Other information and education materials have been autocratic rather than motivational. Less direct strategies such as soap operas that present smaller families as the norm could be explored. A study in India found that fertility rates decreased quicker in districts that had access to cable television programmes which presented smaller families as the norm, than districts that did not receive these cable television programmes, controlling for other factors[12]. A summary of recommendations is provided in Box 2.

9.8 Research recommendations

A more sophisticated statistical approach incorporating formal path analysis is needed to untangle the connections between fertility intentions, contraceptive use, and fertility outcomes, as well as their pre-cursors like marital status, age, parity and education. Further research into the predictors of changes in fertility intentions is also needed to better understand women's motivations, and how such changes influence contraceptive use dynamics.

It was not possible to compare directly retrospective, prospective, and current reports of contraceptive use, using the data presented in this thesis, as field-work for the multi-round sexual behaviour survey, the family planning card study, and the qualitative study, took place at different times. If existing datasets are available elsewhere that lend themselves to such analyses, retrospective calendar data should be compared with prospective data as well as cross-sectional interviews for the same time-period. This would shed further light on the reliability and validity of different data collection methods for evaluating contraceptive dynamics, in particular consistency of use. Furthermore, an evaluation of the use of probes in cross-sectional surveys of contraception would be necessary, to assess whether they can improve the quality of conventional estimates of CPR.

The routine data collection responsibilities of health care providers should be reviewed, to ensure their work-loads are reasonable. Routine data collection should be reduced to data that can enable the estimation of key indicators that are needed for monitoring. Re-trainings that assist health care providers to capture the data correctly are also important, for improving data quality, efficiency, and utility.

Evaluations of family planning interventions – such as approaches to remind women to attend for follow-up appointments as outlined in the previous sub-section – would be necessary prior to scale-up. Implants are already being scaled up in Malawi. IUDs are rarely used but it is unclear if this is due to lack of supply, or because they are culturally unacceptable in Malawi and so there is little demand. The potential for IUDs to be scaled-up

should also be explored, as a cheap alternative long-acting reversible method[143, 188].

Box 1: Take home messages – findings

- Conventional assessments of contraception are prone to over-estimation of the CPR. The methods presented here generate a more reliable estimate of the *actual CPR*.
- There is a need for prospective research methods to close gaps in knowledge on contraceptive switching and discontinuation.
- In the context of high dependence on short-term methods (particularly injectables), continuity of use becomes an important determinant of fertility.
- Women view themselves as contraceptive users, even if they are not using contraception consistently.
- High discontinuation rates of injectables/OCP were observed.
- Providing high quality contraceptive services is not enough. Fertility intentions and the *desire* to have a smaller family is also important.

Box 2: Take home messages – recommendations

- There is a need to develop and evaluate tools to remind and enable women to present for repeat appointments of short-term methods.
- Focus on long-acting methods is key to enable women who want no more children or to delay childbearing to achieve their fertility desires.
- Programmes aimed at reducing fertility rates must tackle high fertility norms, possibly through mass media campaigns.
- Provide confidential contraceptive services, so that women – particularly in the postpartum period – can access services in confidence.

9.9 Generalizability

Although the field-work presented in this thesis was conducted in a relatively small part of northern Malawi, the themes and issues are not unique to this area. The high fertility rates co-existing alongside high levels of contraceptive use are experienced in the rest of rural Malawi. Furthermore, the pressures to have children and the culture of high fertility norms is typical for much of sub-Saharan Africa. One important difference between the DSS area and much of the rest of Malawi is that this is a patrilineal community. In the south of Malawi matrilineal communities are more common. However, the majority of sub-Saharan Africa is patrilineal, as in Karonga. Kinship systems are important because it is likely they apply pressure and influence the desire to have children through differences in responsibility, inheritance and investment[199-201].

Malawi has a higher contraceptive prevalence rate than many other African countries. Nevertheless, other countries might learn from Malawi's experiences if their TFR does not reduce as expected following increases in CPR. In analysing such anomalies, researchers might wish to consider issues of continuity of use of contraception. Reasons for discontinuation (Chapter 7) are unlikely to be very different in the Karonga context compared to other parts of sub-Saharan Africa.

9.10 Limitations

Limitations of the family planning card quantitative and qualitative study were presented in linking material after the research papers (Chapters 5 and 7). There are also some general limitations that deserve mention. The Karonga Prevention Study has been in operation for over thirty years, working on leprosy, TB, HIV and social science studies. Over the last eight years there have been a number of studies focusing on sexual behaviour. Therefore it is possible that the Hawthorne effect could be occurring, whereby study participants begin to "know" the desirable answers to questions and so modify their

responses. This would not have affected the family planning card study (as this was provider-recorded data), but could have affected the multi-round sexual behaviour study and the qualitative interviews. In fact, current use of contraception increased by 10.1% from round 1 to round 3 of the multi-round sexual behaviour survey, and this could have been in part due to the Hawthorne effect.

The multi-round sexual behaviour survey took place during 2008-2011. The family planning card study took place 2012-2013, and the qualitative study took place in 2013. If they had taken place concurrently, I would have been keen to compare retrospective, prospective and current responses from the same women, in order to shed light on the reliability and validity of the different data collection methods. If I had the opportunity of conducting the 2012-2013 studies first, I might have made some changes to the multi-round sexual behaviour survey. For the question on current contraceptive use, I would have separated the category “traditional” as a method of contraception into: withdrawal, calendar, abstinence, and folk methods, as they offer varying degrees of protection against pregnancy.

9.11 Dissemination

I presented this PhD work orally and as posters at a range of conferences and meetings – locally and internationally – as follows:

- Presented to academics at Malawi-Liverpool-Wellcome Trust programme, Blantyre, 17th March 2014
- Oral presentation “Contraceptive discontinuation in rural Karonga district” College of Medicine/National AIDS Commission dissemination conference – Lilongwe Malawi, 23 November 2013
- Poster “Family planning and desires for children: What is the impact on fertility in Malawi?” College of Medicine/National AIDS Commission dissemination conference – Lilongwe Malawi, 23 November 2013

- Poster “Family planning and desires for children: What is the impact on fertility in Malawi?” International Conference on Family Planning – Addis Ababa Ethiopia, 12-16 November 2013
- Oral presentation “Contraceptive dynamics in Karonga: Facilitating factors and barriers to use” Social Sciences in Health Network Meeting – Blantyre Malawi, 27 September 2013
- Poster “Inconsistent contraceptive use in northern Malawi: Communicating the findings” LSHTM Annual dissemination conference – London, 24 September 2013
- Oral presentation “Contraceptive discontinuation in northern Malawi” The International Union for the Scientific Study of Population, International Conference – Busan, South Korea, 26-31 August 2013
- Co-author on poster “A comparison of prospective and retrospective fertility intentions in northern Malawi” The International Union for the Scientific Study of Population, International Conference – Busan, South Korea, 26-31 August 2013
- Poster “A new method for evaluating family planning usage in northern Malawi” LSHTM Annual dissemination conference – London, 5 November 2012
- Poster “A new method for evaluating family planning usage in northern Malawi” College of Medicine dissemination conference, 27 October 2012

The work has also been presented on a number of occasions at KPS’s Continuing Professional Development seminars, at the Karonga District Health Office, and at LSHTM for the PhD upgrading. I prepared one-pagers with key findings and presented this to each health facility in the DSS study area. I intend to visit Malawi in April 2015 in order to present the findings to the Reproductive Health Unit (Ministry of Health), and Banja La Mtsogolo (BLM), as part of disseminating the findings within Malawi. I will prepare a policy brief leaflet with key findings for policy-makers and senior health professionals in Malawi. Internationally, I will be presenting the findings at Marie Stopes International in London, and will be presenting the paper in Chapter 8 at the IUSSP Seminar on Postpartum and Post-abortion Family Planning.

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Appendices