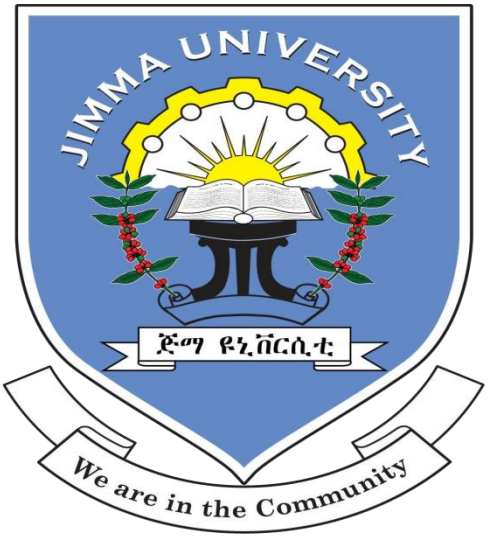
Prevalence, pattern and associated factors for long acting reversible contraceptive use among mothers in immediate postpartum period at Jimma University Medical Center: A cross sectional study



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Research thesis to be submitted to department of obstetrics and gynecology, institute of health, Jimma University; in partial fulfillment for the requirements of the certificate in Obstetrics and Gynecology specialty

AUGUST 2017

JIMMA, ETHIOPIA

Prevalence, pattern and associated factors for long acting reversible contraceptive use among mothers in immediate postpartum period at Jimma University Medical Center: A cross sectional study

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ABSTRACT

***Background**: The provision of effective contraception is fundamental to the practice of women's health care. Waiting at least for 24 months before attempting the next pregnancy was recommended to reduce the risk of adverse maternal, perinatal and infant outcomes. Long acting reversible contraception (LARC) methods have multiple advantages over other contraceptive methods. The most effective methods are intrauterine contraceptive devices (IUCD) and implants. Despite the advantages of LARCs, they are infrequently used in Ethiopia.*

***Objective:** To assess the prevalence, pattern and associated factors for LARC method use among counseled mothers in immediate postpartum at JUMC, Jimma town, southwest Ethiopia.*

***Method:** A cross-sectional study was conducted on 393 women who gave birth at JUMC from November 12, 2016 to January 21, 2017. Data collected by face-to-face interview and record review using pre-tested questionnaire and analyzed using SPSS 20. Logistic regression was used to identify associated factors for LARC use and the result was presented by text, tables and figures.*

***Results:** The overall prevalence of LARCs use among immediate postpartum mothers during study period was 53.2% (209/393) and more than three quarter (78.0%) of participants used implanon. The most common reported reasons for not using LARC were preference of other method (25.5%).*

Mothers who have more than four live kids were 2.6 times more likely to use LARCs than those only have one child (AOR=2.6 95% CI:1.15,5.95), those had monthly income of more than 1000 ETB were 2.4 times more likely to use LARCs (AOR=2.4,95% CI:1.08,7.20). Mothers who planned to extend next birth more 2-years were 3.8 times more likely to use LARC than mothers who planned within next two years (AOR=3.8, 95%CI:1.60,9.28) and those women who were completed family size were two fold more likely use of LARCs compared with those women need more child (AOR=1.9,95%CI:1.12,3.15). Mothers who had prior used LARC were three folds likely to use LARC than their counter parts (AOR=3.1, 95%CI: 1.30, 7.20) and mothers who ever counseled about LARCs before delivery were two fold likely to use LARCs (AOR =2.1:95%CI: 1.01, 4.73).

***Conclusion:** In this study, there was high utilization of LARC methods among counseled immediate postpartum mothers. High monthly income, previous experience of LARC use, receiving counseling before delivery, more than four live kids, plan to delay next pregnancy more two years and completed family size were found to be determinant factors for current LARC use.*

The findings from the study highlight the need for providing and counseling service of LARC methods for all mothers during antenatal care follow up and delivery was high recommended.

***Key terms:** Long acting reversible contraception (LARC), Immediate postpartum, Ethiopia*

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ACRONYMS AND ABBREVIATIONS

ANC - Ante Natal Care

AOR - Adjusted odds ratio

BTL - Bilateral tubal ligation

CD - Caesarean Delivery

DVT - deep venous thrombosis

CI - Confidence interval

CHF - congestive heart failure

COR - Crude odds ratio

EDHS - Ethiopian Demographic and Health Survey

FP - Family Planning

IUCD - Intra Uterine Contraceptive Device

JU - Jimma University

JUMC - Jimma University Medical Centre

JUSH - Jimma University Specialized Hospital

JUSTH - Jimma University Specialized teaching Hospital

LARC - Long reversible contraceptive

LTC - Long term contraceptive

MDG - Millennium Development Goal

OB/GYN - Obstetrics and Genecology

OD - Odd ratio

PPFP - Postpartum family planning

RH - Reproductive Health

RR - Risk Ratio

SD - Standard Deviation

SNNP - Southern Nation and Nationality of Ethiopia

SNNPRS - South Nations, Nationalities and Peoples Regional State

SPSS - Statistical Package for Social Scientists

SSA - Sub-Saharan Africa

SVD - Spontaneous Vaginal Delivery

USAID - United States Agency for International Development

WHO - World Health Organization

CHAPTER ONE - INTRODUCTION

1.1 - Background

The job of family planning remains unfinished, despite great progress over last several decades, more than 120 million women worldwide want to prevent pregnancy, but they and their partners are not using contraception. Reasons for unmet need are services are not yet available everywhere, choices are limited, fear of social disapproval, partner's opposition, worries of side effects and lack knowledge about contraceptive options and their use (1).

Two thousand two hundred twenty two (222) million women in low and middle income countries would like to delay childbearing, but are not using any method of contraception. According to WHO and UNAID by 2020 more 120 million women and girls will access modern contraceptives. Among women and girls with an unmet need for family planning are those who have recently given birth and the reasons for low use are not well understood (2).

Promotion and utilization of effective and convenient family planning methods in countries with high birth rates and limited resources have a potential to improve maternal and child health. These could reduce the costs of achieving millennium development goals. However, the contribution of LARC methods, including intrauterine device and implant in Ethiopia is very low (2).

Ethiopia is the second most populous country in Africa with it fast population growth rate. Every year one million unwanted pregnancy, 3400 abortion, 130,000 infant deaths and more than 6800 women die during child birth. So, LARC a method is vital approach to halt problems arising from fast population growth and complication related with pregnancy (3, 4, & 5).

Fertility is an important component of population dynamics which plays a major role in changing the size and structure of a given population. Differences in a country's fertility levels can be attributed to the differences in the length of the reproductive life of women and differences in the length of time between births when women are exposed to the risk of conception (4).

Closely spaced pregnancies increase risks of infants with adverse outcomes such as preterm, low birth weight and small for gestational age. Pregnancy occurring within six months of last delivery holds 7.5-fold increased risk for induced abortion, 3.3-fold increase in miscarriage and 1.6-fold increased risk of stillbirth, currently WHO and USIAD recommend minimal a live birth interval of two years (5, 6).

Sub-Saharan Africa (SSA) faces monumental reproductive health challenges, including the highest maternal mortality, population growth, total fertility rates and much unmet need for family planning in the world, in last decade most of SSA countries were striving to avert the problem and experiencing fertility decline and concomitant rise in contraceptive use (5, 7).

Contraceptive use is one of four key factors that determine fertility; the other three are sexual union, postpartum non-susceptibility and induced abortion. Of the four, contraception has the strongest effect on fertility in most developing countries. Use of modern contraception is of great importance in public health and improvement of economic productivity as well as health of mother and child (8)

While family planning (FP) is important throughout an individual's and couple's reproductive life, postpartum family planning (PPFP) focuses on prevention of unintended pregnancies and to prolong space between current birth and next pregnancy. Promotion of contraception in countries with high

birth rates has the potential to reduce poverty, hunger and avert 32% of all maternal deaths and nearly 10% of childhood deaths (8).

In order to improve the efficacy of available contraceptive methods it is of importance to identify factors influencing women's choice of contraception and why they start or stop using a certain method. Choice of contraception is strongly related to knowledge, age and parity of women (4, 9).

Globally, FP is recognized as a key life-saving intervention for mothers and their children. PPFP has important role to play in strategies to reduce the unmet need for FP. Postpartum women are among those with the greatest unmet need for FP. Yet they often do not receive the services they need to support longer birth intervals or reduce unintended pregnancy and its consequences (5, 6, & 9).

According to an analysis of Demographic and Health Surveys (EDHS) data from 27 countries, 95% of women who are 0-12 month's postpartum mothers want to avoid pregnancy in the next 24 months; but 70% of them are not using contraception (6, 8).

Globally, female sterilization is the most common method of contraception, used by 19% targeted mothers, followed by 14% were Intra Uterine Contraceptive Device (IUCD) and 9% were pill among women aged 15 to 49 years who were married or in a union. However, based on the mini 2014 EDHS analysis, the use of all modern contraceptive is low, only 28.8% for all women (9).

The unmet need among women in extended postpartum period was very high in Ethiopia. Utilization rate of modern FP methods among reproductive age group mother includes: 77% injectable, 10% implants, 7% pills, 1% IUCD, 1% female sterilization and 1% condom (10).

Nationally, Ethiopia strives to improve utilization rate of modern contraceptives specifically long term reversible contraceptive (LARCs), For instance, the government of Ethiopia has targeted 55% contraceptive prevalence rate by the year 2020, of which 35% is expected to come from LARCs, which in turn implies that much needs to be done to increase uptake of LARC methods. Despite of these expectations LARCs utilization remain low (11).

1.2 - Statement of the problem

Maternal health is big issue and is central to sustainable development. Each year, about 210 million women become pregnant and about 140 million newborn babies are delivered-the sheer scale of maternal health alone makes maternal well being and survival vital concerns (12)

Postpartum contraceptive use is a primary strategy for reducing unintended pregnancy and optimizing birth spacing yet during 2004-2006, about 12% of women with a recent live birth reported not using any method of contraceptive method and only 62% reported using modern effective contraceptive methods (13).

Ideally, contraceptive counseling for pregnant women begins during prenatal period because women in the immediate postpartum period are typically focused on childbirth recovery and newborn care. However, in Ethiopia only about 62% of pregnant women have at least one prenatal visit (5, 13).

FP is a potent tool in the reduction of maternal death, improving child health and empowering adolescents and youth sexual reproductive health and rights. Promotion of FP in countries with high birth rates has potential to reduce poverty and hunger and avert maternal deaths and childhood deaths. However, access to family planning can be significantly hindered in strongly male dominated patriarchal societies. Women are not able to fully exercise their rights of receiving family planning services and most importantly access health institutions when they require them (14).

Every four minute of every day, at least one woman dies from complications related to pregnancy and childbirth, a total of more than half million mothers died every year, 99% of these deaths occur in developing countries. Women in these countries face greater risks during pregnancy, childbirth and post partum period because they are more likely to deliver without trained assistance, have limited access to adequate medical care in the event of complications and frequent child birth. Long-acting reversible contraceptive methods can substantially reduce the high levels of unwanted pregnancy as well as maternal mortality and morbidity more in developing countries (9).

Women have right to have good quality and woman-centered maternal health care need is universal, from truly series global report, some women receive excellent care but too many experience one of two extremes: too little, too late or too much, too soon. In 2015, 216 women died of maternal causes per 100,000 live births, but still far short of MDG, global target for 2030 is 70 per 100 000, requiring a 68% reduction (12).

Contraception use can avert more than 30% of maternal deaths and 10% of child mortality if couples space their pregnancies more than 2 years apart. Closely spaced pregnancies within the first year postpartum are the riskiest for mother and baby, resulting in increased risks for adverse outcomes, such as preterm, low birth weight and small for gestational age (9).

FP use, allowing women to delay motherhood, prevents unintended pregnancies and avoids unsafe abortions. It also allows women to stop childbearing when they have attained their reproductive goals. By spacing births, FP can prevent an average of one in four infant deaths in developing countries. Adequate birth spacing can improve the survival of the next older brother or sister (14).

Often promotion and utilization of effective and convenient family planning methods in countries with high birth rates and limited resources have a potential to improve maternal and child health. These could reduce costs of achieving millennium development goals (14).

Knowledge about site of administration, prior LARC use and women's attitude that male partners' choice influence their contraceptive decisions were positively associated with current use of LARC. Contrary, attitude that LARC was for married women was negatively associated with its use (15).

According to EDHS (2011), contraceptive discontinuation rate for all methods was 37%. The highest discontinuation rate was for the pill (70%), followed by male condom (62%). But, LARC have low discontinuation (5%) and low failure rate (0.2%). Nationally, Ethiopia strives to improve the utilization rate of modern contraceptives specifically LARCs (16).

According to WHO report estimated 358,000 maternal deaths occurred worldwide in 2008, developing countries account for 355,000 of the deaths. Sub-Saharan Africa and South Asia accounted for 87% (313,000) of global maternal deaths. Ethiopia is one of countries with highest MMR which is 412 maternal deaths per 100,000 live births. Majority of maternal and new born deaths can prevented with proven interventions to ensure that every pregnancy is wanted by using the most effective modern FP methods and every birth is safe (5, 10).

Family planning is a human right and is essential to women's empowerment. Women and couples who want safe and effective protection against un wanted pregnancy would benefit from access to more contraceptive choices, including long acting and permanent contraceptive methods. But the most FP users in Ethiopia prefer to use short-acting FP methods. According to the mini EDHS 2014 report, short-acting FP methods accounted for 34.2% of use among the total modern contraceptive users. On the other hand, prevalence of use of LARC family planning methods is only 5.9% (5, 17).

Utilization of LARC is related with level of education, age of women, occupation of the women, husband-wife discussion, religious, cultural, previous history of using, receiving counseling during ANC, delivery and postpartum periods were found major determinant for LARC use (18).

Women's awareness and choice of contraceptives is limited to short acting methods. There is perceived fear of side effects of modern contraceptive use. Women who do desire no more children were not using any method. Therefore, strengthening FP counseling to address fears of side effects and increase awareness of expected and unexpected side-effects of all methods is essential (14).

Although FP services are available in most places, national as well as the regional contraceptive prevalence rate is still low, in addition there is insufficient distribution of modern contraception and wide range of modern contraceptive choice is also lacking to meet the demand of clients. Studies on LARC use are rare in Ethiopia and nonexistent in Jimma Zone and the surrounding area. Therefore this study tries to assess prevalence, pattern and determinants related to choice of LARC use (5, 9).

As to the knowledge of the investigator, there were no specific studies conducted on pattern and determinants of uptake of long acting reversible contraception among mothers in the immediate postpartum period in local area. Therefore, this particular study will try to address all fundamental components of the problem and will generate important findings that hopefully substantiate current knowledge, practice and fill the gap.

CHAPTER TWO - LITERATURE REVIEW

2.1 Literature Review

Globally, 222 million women like to delay pregnancy after childbirth but all are no access to contraception. Meeting contraceptive need allow women to control their own fertility and reduce maternal deaths by one-third, with lasting benefits for their families and communities. Worldwide, more than 9 out of 10 women want to avoid pregnancy for 2 years after having had a baby, but 1 in 7 of them not using contraception. Closely spaced pregnancies within first year postpartum increase the risks of preterm birth, low birth weight and small-for-gestational-age babies (2, 17).

Provision of family planning counseling during postpartum period is critical to ensuring subsequent maternal and child health. Immediate postpartum period is particularly favorable time to provide LARC methods and postpartum provision of LARC is safe and effective. But some patients have difficult to access LARC in a health facility setting (18).

However, access to family planning can be significantly hindered in strongly male dominated patriarchal societies. Decisions on use of family planning are thus driven and dictated by cultural and patriarchal values. It is therefore crucial for interventions that are geared towards increasing access to family planning to adopt strong gender sensitive programming (15).

Globally 1 million of under five child deaths could be averted by elimination of inter-birth intervals of less than 2 years. Effective use of postpartum family planning is the most obvious way in which progress should be achieved. Wait at least 24 months after a live birth before attempting the next pregnancy in order to reduce the risk of adverse maternal, perinatal and infant outcomes (19).

The American College of Obstetricians and Gynecologists has recommended increased use of LARC to reduce the high rate of unintended pregnancy and increased use of LARC in the postpartum period could also prevent short inter-pregnancy intervals. The high interest using LARC exists among postpartum women, particularly among women with a recent unintended pregnancy and women who do not desire pregnancy for at least 2 years. Postpartum contraceptive use is a primary strategy for reducing unintended pregnancy and optimizing birth spacing, improving maternal and child health (20).

Contraceptive choice is central element of quality of care in provision of family planning services. Over the past 30 years, development of modern contraceptive methods has given people greater individual freedom and enhanced their ability to plan their families. LARC methods can substantially reduce the high levels of unwanted pregnancy as well as maternal mortality and morbidity more in developing countries (16).

From a study in United States 2011 demonstrated large uptake of LARC methods when such methods were included in counseling and made available without financial obstacles. In a sample of 2,500 women, 67% chose either an IUCD (56%) or single-rod contraceptive implants (11%) (7).

The study in turkey 2013, the prevalence of using contraceptive methods among postpartum women was 32.9% and IUD was the most preferred method. There was statistically positive significant relation between taking contraception counseling during pregnancy with using postpartum contraceptive method. The reasons for wanting to use postpartum contraceptive were prevention future pregnancies, child spacing and few side effects (21).

The principal factors affecting intention to use LARCs were women's perception that LARCs can harm womb and husband's support. Other factors which were significantly associated with intention to use LARCs were knowledge of any of LARCs, partner's educational level, participants working status, women's desire to have additional children within the next two years or soon and ideal number of children wanted to have (22).

Postpartum Adolescent Birth Control Study, African American adolescent mothers in Chicago 2011; twenty participants expressed desire for an IUCD, almost in early postpartum period. Of these 20, twelve did not receive IUCD within 12-month study period and three of adolescents experienced repeat pregnancy (23).

In low-income countries, increasing emphasis on antenatal care (ANC) and institutional delivery has created opportunity to counsel women about family planning. The health benefits of contraception and birth spacing for women and their infants are striking (24).

Approximately 75% of women and couples in sub-Saharan Africa who want to space or limit their births are not using any form of contraception. Data from DHS 2011 of six sub-Saharan countries (Botswana, Burundi, Ghana, Mali, Togo and Uganda) were show that the proportion of women currently using LARCs is significantly lower than the proportion using short-acting methods. In many countries in the region, only fewer than 5% of women who used contraception are using LARCs (25).

Countries with high rate of unintended pregnancies may be due to relatively low use of LARCs. Less than 2% of Brazilian women who take contraceptives use LARCs and rate of unintended pregnancy are 55%. By comparison, in the UK, LARCs are used by 31% of women using contraceptives and the rate of unintended pregnancies there is estimated to be 16.2% (26).

A number of studies show that education of women is significantly associated with unmet need. For instance, in Kenya women with primary incomplete education were twice as likely to experience an unmet need for family planning compared to those with primary complete or higher education. For instance study done in Ghana identified that LARCs were used mainly by women with more living children and those had previously used LARC (26, 27).

Similarly, a study in Uganda showed that current use of LARC was 31.7% and factors associated with current use of LARC were previous use, knowledge of respondents about LARC and perception that; male partner decisions positively influence their choices (15). Another study in Mekelle city, Ethiopia, 2014, indicated the reasons for not accepting LARC were because of side effects 128 (44.8%), fear of infertility after use 117 (40.9%), and 38 (11.1%) husband disapproval. The same study reflected that, 183 (53.5%) of clients do have future intention to utilize long acting reversible contraceptives (22).

Although similar studies (LARC) are lacking in Ethiopia, few were done on LARCs. For instance study done in Goba town by Abulie et al., Reflected that use of LARCs was significantly associated with ever use, number of times discussions made on methods and main decider of using methods. Study done in Mekelle town, 2012, identified that mothers who had good knowledge were 8 times more likely to use LARCs as compared with those who had less knowledge. Mothers who had two or more pregnancies were 3 times more likely to use LARC as compared with those who had one-pregnancy (22, 27).

The study in Mekelle town shows, the main reasons for not accepting LARC methods reported by women were because of the side effects, fear of infertility after use and husband disapproval. This similar with the study done in Jinka town, husband disapproval, fear of sterility lack of knowledge, cultural and religion disapproval and fear of several side effects (22, 28).

From Ethiopian Journal of Health Development 2014; Out of 986 short-acting family planning users interviewed, 18.2% explained their intention to shift from short-acting to long-acting methods of contraception. Among those had intention to change to LARC methods, 95.6% preferred implants and 4.4% intrauterine contraceptive device (IUCD) (17).

From study done in Gambela, Ethiopia 2013 show overall prevalence of long acting contraceptive method was low, is only 7.3%. Implant (50%) was the most widely used method. Knowledge of contraceptive and age of women have significant association with the use of long acting reversible contraceptive methods (6). Similar with the study done in Dendi District, Western Ethiopia, women who have discussed about LARCs with their husband were found 15.48 times more likely to use long acting contraceptives than those who have never discussed about LARCs (29).

Report from mini EDHS 2014 and study by Yirga Ewnetu (2015) in SNNP, Ethiopia found that the prevalence of LARC method use among mothers during their extended postpartum period was 36.7% and the unmet family planning need of mothers in the extended postpartum period was 27.9% and the most widely used LARC was implants (5, 18).

Result from EDHS 2016 revealed that the pattern in relationship between contraceptive use and number of living children is an inverted U-shape. Contraceptive use is highest among women with 1-2 children and lowest among women with five or more children and current contraceptive use increases with women's education (5).

In-depth analysis of 2016 EDHS on contraceptive use showed that Orthodox Christians and Protestants were found to have higher likelihood of contraceptive use, as compared to Muslims and also use of any modern contraceptive is highest in city than rural area (5).

A study conducted by Ugandan was indicated previous use, knowledge of respondents about LARC and perception and male partner decisions as the main predictors of LARC use. Also the study conducted in Goba and Mekelle town similarly reflected ever use of LARC and knowledge about LARC respectively as good predictors for long acting and permanent contraceptive methods use (15, 22,30).

2.2 - Significance of the study

Too close pregnancies are the major contributors of maternal and infant morbidity particularly in developing countries like Ethiopia. It places a heavy burden over the shoulders of family economy and health condition in particular and nation's economic development in general. An analysis of factors that influence LARC use among immediate postpartum women will provide planners and policymakers with useful information that lead to encourage increase use of LARC methods

This study, therefore, aimed to identify more common long acting contraceptive used and determinant factors for low utilization among immediate postpartum women in JUSH Jimma Zone and furnish important directions for intervention which help local health planners to critically look at the problem during their planning process.

Particular study was try to adders all fundamental components of problem, carried out to assess different determinant factors, generated important findings and come up with strong recommendation that can be used by all interested organizations who are working on the area of family planning at large.

2.3 - Conceptual framework

The study seeks focused on associated factors for use of LARC in immediate postpartum mothers like awareness of LARC, obstetrics and Socio-demographic and economic factors that influence its acceptance and uptake.

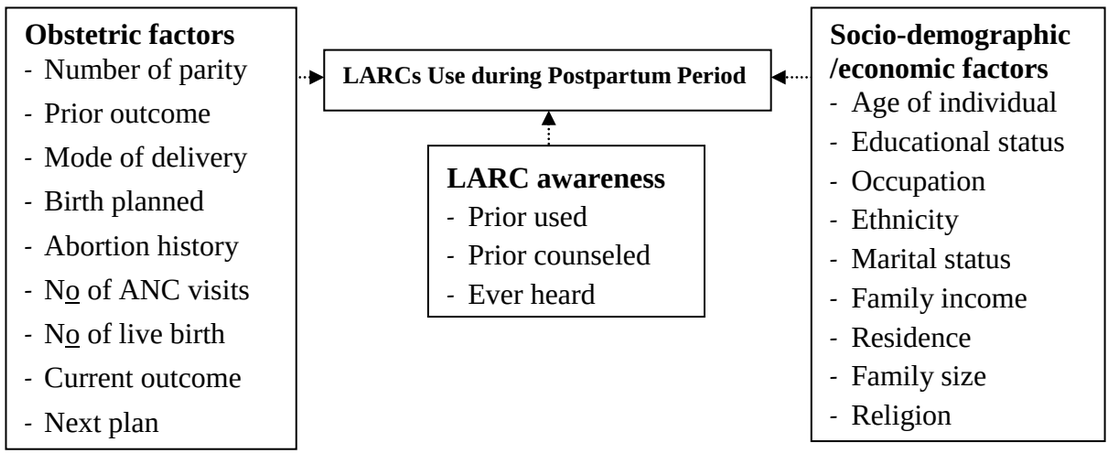

Figure 1 - factors influencing LARC use in immediate postpartum period (prepared after related literature review)

CHAPTER THREE - OBJECTIVES

3.1 General Objective

- To assess prevalence, pattern, and associated factors of long acting reversible contraceptive use among immediate postpartum mothers in JUMC, 2016-2017

3.2 Specific Objectives

1. To determine prevalence of LARC use among the counseled immediate postpartum mothers at JUMC
2. To assess pattern of LARC method use among the study population
3. To identify reported common reasons for not using LARC methods among immediate postpartum mothers
4. To identify factors associated with usage of LARCs among the study population

CHAPTER FOUR - METHODS AND MATERIALS

4.1 Study area and period

The study was conducted in Jimma University Medical Center (JUMC) at maternity ward from November 12, 2016 - January 21, 2017. JUMC is located 352kms Southwest of Addis Ababa in Jimma City. It is the only teaching and referral hospital in the south-western part of the country, providing services for approximately population about 15 million people living in Jimma zone and around South-West Ethiopia. It is also serving as a clinical post graduate specialty teaching hospital for Obstetrics and Gynecology, Internal Medicine, Pediatrics and Child Health since 2005 and for Ophthalmology, and in Surgery since 2007. Department of Obstetrics and Gynecology has MCH clinic, OPD, family planning clinic, referral clinics, Gynecology and maternity wards.

The maternity, labor and delivery ward have 60 beds in addition to seven first stage beds and four second stage couches. OB/GYN unit has number midwifes, medical interns and forty resident physicians who do their daily clinical practice under the supervision of nine consultant Obstetricians and Gynecologists.

4.2 - Study design

Facility based prospective cross - sectional study design was used.

4.3 Population

4.3.1 - Source population

Source populations were all women on the immediate postpartum period who gave birth at JUMC during the study period

4.3.2 - Study population

All immediate postpartum mothers who were eligible for LARC methods during data collection period and fulfill inclusion criteria

4.4 Inclusion and Exclusion criteria

Inclusion: all counseled immediate postpartum mothers for LARCs use during the study period

Exclusion: Mother with puerperal sepsis, chorioamnionitis, DVT, CHF, severe liver disease, previous breast cancer

4.5 Sample size determination and sampling technique

4.5.1 - Sample size

The required sample size was determined by using single population proportion formula considering the following assumptions: 36.7% prevalence (taken from community based cross sectional study at Durame town in SNNPRS, 2015(18), 5% level of significance, 5% margin of error and 10% non-response rate.

$$n = \frac{(Z\alpha/2)^2 P(1-P)}{d^2} = \frac{(1.96)^2(0.367)(1-0.367)}{(0.05)^2} = 357$$

$$n_f = 357 + 10\%*357 = 357+36 = 393$$

4.5.2 - Sampling technique

Convenience consecutive sampling technique was use. Beginning from the first date of data collection, all postpartum mothers who were candidate and counseled for LARC use were involved till the desired sample size was reached.

4.5.3 - Data collection tools

Data collected by face-to-face interview and record review using structured and pre-tested questionnaire and checklist respectively. The questionnaires were developed according to objective of the study after reviewing different literatures relevant to the study. The data collectors were two midwives working at maternity ward and one resident physician assign for family planning, who were also counseling about family planning.

Data collectors and supervisors were trained about the objectives of the study and the data collection tool by the principal investigators for two days. The principal investigator and supervisors were strictly follow the overall activities of the data collection on daily bases to insure the completeness of the questionnaire, to give further clarification and support for data collectors.

4.6 - Study Variables

Dependant variable

- Postpartum LARC use

Independent variables

- Socio-demographic/economic variables (Age, marital status, educational level, religion, ethnicity, occupation and residence, income, family size and husband support).
- Reproductive history of women (parity, number of live birth, prior outcome, mode of delivery, current birth outcome, previous history of LARC use)
- Prior counseled LARCs and number of ANC visit

4.7 - Data analysis procedure

All the quantitative information from questionnaire and interview was cleaned, coded and analyzed using SPSS version 20.0 computer statistical package. A descriptive analysis was carried out for each of the variables. Then a bivariate analysis was done for the independent variables against the outcome variable to select candidate variables for the multivariable analyses. Finally, variables with ($P<0.25$) on the bivariate analysis were entered into the multivariate logistic regression model to identify the independent effect of each covariate. Results were presented by using tables and statistical test to determine associated factors. Final interpretation, discussion and recommendation were made based on the findings of this research.

4. 8 - Data quality management

First, the questionnaire was pre-tested with 5% of sample size on postpartum mothers before the data collection period, which was not included in the actual study and necessary modification was made based on nature of gaps identified in questionnaire.

The midwife nurses who collect the data were given a brief orientation on how to gather the appropriate information, procedures of data collection techniques and the whole contents and subject matter of the questionnaire. The data was collected by trained midwives using standard, structured and pre-tested questionnaire prepared in Afan Oromo. A day today on site supervision by the researcher was carried out during the whole period of data collection.

At the end of each day, the questionnaire were reviewed and cross checked for completeness, accuracy and consistency by the investigator and corrective discussion was under taken with all the data collectors. The data were edited and cleaned to ensure accuracy and consistency completeness of data

4.9 - Ethical consideration

Official letter was obtained from Jimma University (JU) Research and Graduate studies coordinating office and submitted to responsible authorities of hospital and permission to conduct this research was granted by hospital authorities. Before interviewing; informed consent was obtained from each study participant after getting information on the purpose, objective and benefit of the research. Participants were free to withdraw themselves from participation at any time and name or personal identification was not used on the data collection form to keep participants' response confidential.

4.10 - Dissemination plan

The final results of this study will be submitted to the advisors, Jimma University research, graduate studies and CBE coordinating office and to publishers for possible evaluation and publication of the paper for local or international journals. A valuable recommendation will be made based on the result obtained at the end of the study that is going to be implemented during the clinical practice in these segments of the population throughout the country.

4.11- Operational definition and definition of terms

1. **Birth space**: period between a live birth or stillbirth and conception of next pregnancy
2. **Contraceptive Acceptance:** women accepting and receiving a LARC method.
3. **Death -** includes both stillbirth and ENND
4. **Eligibility criteria for LARCs**

   Nearly all immediate postpartum women can use IUCD safely and effectively, except women who has puerperal sepsis, because insertion may substantially worse condition

   Usually, immediate postpartum woman with acute blood clot in deep veins of legs or lungs, severe liver disease, had previous breast cancer are not candidate for use of implants, others can used safely
5. **Long acting revisable contraception** is either of Implanon, Sino-implant/Jadelle or IUCD
6. **Postpartum period** is clinically defined as the first 6 weeks following childbirth
7. **Immediate Postpartum period** is period which includes first 48 hours after delivery
8. **Instrumental delivery** is those delivery assisted by forceps or vacuum instrument
9. **Counseled** - discussion about LARC methods with health professional – about type, time, duration, advantage and disadvantage
10. **Pattern** - type of commonly used LARC methods

CHAPTER FOUR - RESULT

Characteristics of the study subjects

Three hundred ninety three (393) immediate postpartum mothers of JUMC were participated in the study with a response rate of 100%. Of participant mothers, higher proportions (41.7%) were in age group between 25 to 29 years, with mean of age 27.

The majority of participant mothers were Muslim (60.8%), Oromo (63.9%), married (94.9%), one third (31.6%) of them were house wives and close to two third (63.1%) attended formal education of different levels and nearly three fourth of participant (72.5%) income per month was greater than 1000 ETB and the majority (55.7%) of mothers were from rural area (table - 1).

Table 1: Distribution of socio- demographic/economic characteristics of immediate postpartum mothers at JUMC, from Nov 12, 2016 - Jan 21, 2017(N = 393)

S.N	Variables		Frequency	%
1	Age of mothers	15-19	24	6.1
		20-24	91	23.2
		25-29	164	41.7
		30-34	80	20.4
		35+	34	8.7
2	Residence	Rural	219	55.7
		Urban	174	44.3
3	Religion	Muslim	239	60.8
		Orthodox	81	20.6
		Protestants	60	15.3
		Catholics	11	2.8
		Others	2	0.5
4	Ethnicity	Oromo	251	63.9
		Amhara	55	14.0
		Dawro	32	8.1
		Gurage	30	7.6
		Others	25	6.4
5	Marital status	Married	373	94.9
		Single	9	2.3
		Divorced	7	1.8
		Widowed	4	1.0
6	Educational status	Can't read and write	112	28.5
		Only read and write	33	8.4
		Primary school (1-8)	105	26.7
		High school (9-12)	87	22.1

		College or university	56	14.2
7	Occupational status	House wife	124	31.6
		Farmer	88	22.4
		Merchant	76	19.3
		Gov't employee	64	16.3
		Private worker	19	4.8
		Student	17	4.3
		Other	5	1.3
8	Monthly income	≤1000 ETB	108	27.5
		1001-2500 ETB	185	47.1
		>2500 ETB	100	25.4

Reproductive History

Close to two third (65.4%) of mothers were between para 2 to 4, almost all (98.7%) of participants have at least one alive kid, about 30.8% of mothers had two children, and the mean number of a live baby of participant was 2.59.

One hundred eighteen (30.0%) of the current birth were not planned for a time. Just two third (66.2%) of the respondent mothers had a plan to have children in the future whereas 102(26%) will not have a plan to have baby for future and 31(7.9%) of respondents were not yet decided about their future child birth. For those mothers who had a plan to have a child in the future; most of them (76.9%) want to have a child after 2 years stay (table 2).

Table- 2: Reproductive information of mothers in immediate postpartum, JUMC, from Nov 12, 2016 - Jan 21, 2017.

S.N	Variables		Frequency	%
1	Number of parity	1	84	21.4
		2-4	257	65.4
		5+	52	13.2
2	Mode of delivery	SVD	212	53.9
		Assisted breech	12	3.1
		Instrumental	40	10.2
		Cesarean section	129	32.8
3	Current birth outcome	Alive	364	92.6
		Dead	29	9.4
4	Number of live kids	1	91	23.5
		2-4	254	65.5
		5+	43	11.0
5	Need more babies	Yes	260	66.2
		No	102	26.0
		Yet not decided	31	7.9
6	Next delivery plan within two years(n= 260)	Yes	60	23.1
		No	200	76.9

Awareness and utilization of LARC methods

Three hundred nine (78.6%) of the study participant mothers ever heard about LARC methods from different sources. The main sources of information were health workers (79.9%), the others information source were from their friends (8.1%), her husband (1.0%), mass media (9.4%) and few were during attended school and at family planning clinic.

Regarding the uptake of maternal health service, 352 (89.6%) of the study participant mothers had attended at least a single antenatal visit (ANC) during their last pregnancy. Of these mothers, only 106 (27%) had received counseling service on LARC methods during ANC visit

Among the 393 participant mothers who were enrolled in study, 92(23.4%) had previously used LARC method. Of the total, 76(82.6%) used Implanon followed by 10(10.9%) Jadelle/Sino implant and 6(6.5%) used IUCD and majority participant mothers discontinued contraceptive because of desire for pregnancy (table - 3).

Table - 3: Awareness and utilization of LARC among mothers in immediate postpartum period, in JUMC, from Nov 12, 2016 - Jan 21, 2017.

S.N	Characteristics		Frequency	%
1	Ever heard about LARCs	Yes	309	78.6
		No	84	21.4
2	Ever counseled (ANC, labor, FP clinics)	Yes	192	48.8
		No	201	51.2
3	Time of counseled N = 192	During ANC visit	106	55.2
		FP clinics	53	27.6
		During delivery	33	17.2
4	Method previously used N = 92	Implanon	76	82.6
		Sino-implant/Jadelle	10	10.9
		IUCD	6	6.5
5	Reason for discontinuation	Desire of pregnancy	66	71.7
		Side effects	14	15.2
		Influence by others	5	5.4
		Religious prohibition	3	3.3
		Others	4	4.3

LARC Method Use

According to the study, prevalence of current LARC user was 53.2%, more than three fourth (78%) used implanon followed by Jadelle/Sino Implant and IUCD (See pie chart - 2).

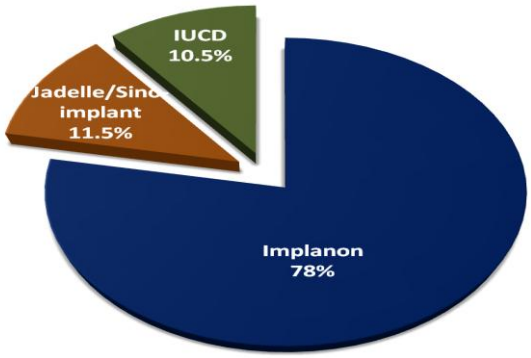

Figure - 2: Pie chart showing current type of LARC methods used among immediate postpartum mothers during study period, in JUMC, from Nov 12, 2016 - Jan 21, 2017.

Various reasons were reported for not using LARC methods during study period. The commonest reported reason was preference of other form of contraceptive methods (25.5%) and others were fear of side effects, religious prohibition, want to use LARC methods other time, opposition from partner and want to have more child (see figure - 3).

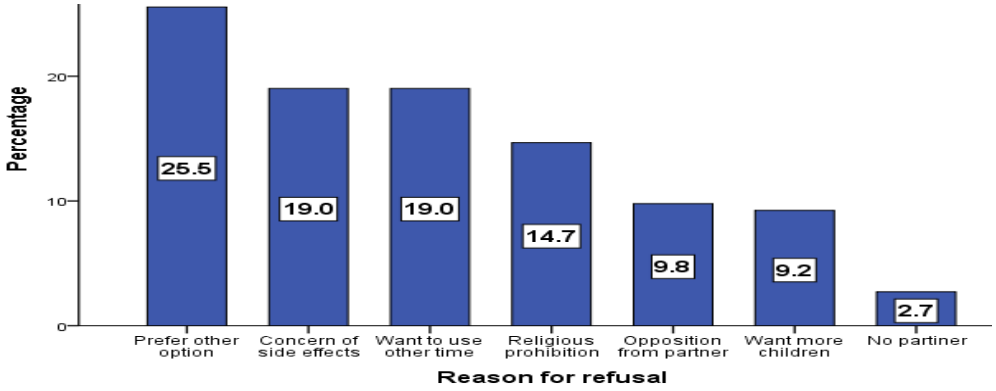

Figure -3**:** Percentage distribution of reasons of respondents not using LARC methods

Associated factors for LARC use

Bivariate and multivariate logistic regression analyses were done to identify factors associated with LARC method use. The results of these analyses showed that ever counseled, monthly income, family size more than four, completed family size, plan to delay next pregnancy beyond two years and prior use were found to be factors associated with current use of LARC methods.

Those mothers who had a monthly family income of 1000 ETB or more were 2.4 times more likely to use LARC methods as compared with those had a monthly family income less than 1000 ETB (AOR = 2.4, 95% CI: 1.08, 7.20).

The mothers who have more than four alive kids were 2.6 times more likely to use LARCs than those women who have only one child (AOR = 2.6 95% CI: 1.15, 5.95) and those women who were completed family size were approximately two times more likely utilization of postpartum LARC methods compared with those women need more child (AOR = 1.9, 95%CI: 1.12, 3.15).

Those mothers who planned to extend next birth beyond two years were nearly four times likely to use LARC methods than mothers planned next birth within next two years (AOR = 3.8, 95%CI: 1.60, 9.28) and the mothers who had previously experience of LARC use were three fold more likely to use LARCs than their counter parts (AOR = 3.1, 95% CI: 1.30, 7.20).

Those mothers who have counseled about LARC services during at FP clinics, during ANC visits and labor were found to be two fold higher in using the LARC methods than those mothers who were not counseled before delivery (AOR = 2.1; 95%CI: 1.01, 4.73).

Table 5 - Factors associated with current LARC use among mothers in immediate postpartum period, in JUMC, from Nov 12, 2016 to Jan 21, 2017.

Variables		Current LARC use		Variables association	
		Yes	No	COR, 95%CI	AOR, 95%CI
Maternal age N = 393	15-24	52.2%	47.8%	1¥	
	25-34	52.1%	47.9%	1.0(0.64, 1.55)	1.1(0.56, 2.16)
	35+	64.7%	34.3%	1.7(0.76, 3.71)	1.2(0.34, 3.83)
Mode of delivery N = 393	Vaginal	50%	50%	1	
	Cesarean	59.7%	40.3%	1.5(1.0, 2.27)*	1.6(0.82, 3.02)
Current birth outcome N = 393	Dead	41.4%	58.6%	1	
	Alive	54.1%	45.9%	1.7(0.78, 3.60)	2.5(0.41, 15.35)
Number of Parity N = 393	1	55.9%	44.1%	1	
	2-4	48.6%	51.4%	0.7(0.45, 1.22)	0.19(0.03, 1.48)
	5+	71.2%	28.8%	1.9(1.0, 4.06)*	0.50(0.11, 2.32)
Number of alive kids N= 388	1	50.5%	49.5%	1	
	2-4	50.8%	49.2%	1.0(0.63, 1.62)	0.8(0.51, 1.41)
	5+	72.1%	27.9%	2.5(1.16, 5.52)*	**2.6(1.15, 5.95)#**
Completed family size N = 393	No	50%	50%	1	
	Yes	66.7%	33.3%	2.0(1.24, 3.23)*	**1.9(1.12, 3.15)#**
Next delivery plan within two years(N=260)	Yes	23.2%	76.8%	1	
	No	59.7%	40.3%	4.9(2.61, 9.20)*	**3.8(1.60, 9.28)#**
Ever heard of LARC N = 393	No	28.6%	71.4%	1	
	Yes	59.9%	40.1%	3.7(2.21, 6.31)*	1.2(0.47, 3.11)
Ever counseled N = 393	No	36.3%	63.7%	1	
	Yes	63.2%	36.8%	3.0(2.00, 4.60)*	**2.1(1.01, 4.73)#**
Previously LARC method used (N = 393)	No	46.2%	53.8%	1	
	Yes	76.1%	23.9%	3.7(2.18, 6.30)*	**3.1(1.30, 7.20)#**
Monthly income N = 393	≤1000 ETB	36.1%	63.9%	1	
	>1000 ETB	59.7%	40.3%	2.6(1.65, 4.14)*	**2.4(1.08, 4.73)#**

** COR P-value <0.05* 1¥ logical reference *#AOR P-value <0.05*

CHAPTER SIX - DISCUSSION

Our study tries to find out the prevalence, reported reasons for refusal and associated factors for utilization of LARC among immediate postpartum mothers during study period, at JUMC in Jimma town, Southwest Ethiopia. According to the study, prevalence of current LARC user was 53.2%, more than three fourth (78%) used implanon followed by Jadelle/Sino Implant (11.5%) and IUCD (10.5%) and awareness and prior used LARC methods was the most common determinant factors for use.

The study finding was much higher than national based estimates 10% of women use LARC as reported in Ethiopian DHS 2016 (5) and 18.2% from Ethiopian journal of health development 2014 (18). This might be due to fact that our study counsel participate mothers about LARC method after collect necessary information and also difference in the socio demographic status of the immediate postpartum women.

This finding was also line up with study done in united state 2011 which was 67 % (7). However, the finding was greater than study done in region of sub Saharan Africa in 2011 (10%), in Turkey in 2013 (32.9%), in southern Ethiopia in 2014 (36.7%), in northern Ethiopia in 2012 (37%) and in South East Ethiopia in 2012 (18.1%) (18, 21, 22, 25 & 30).The great increment might be explained by providing awareness for importance of contraception.

Current utilization of LARC prevalence is high compared to study done in Dendi Western Ethiopia 2015 and in Goba eastern Ethiopia 2012, which shows that LARC use have prevalence was 17.6% and 8.7% respectively (29, 30), parallel to this study IUCD used much lower rate than implanon. This may because of perineal pain during immediate postpartum contributed to low utilization of IUCD.

However, IUCD used was nearly similar with study done in Durame Town**,** Southern part of Ethiopia in 2014 (7%), finding from Ethiopian journal of health (4.4%) in 2014 and EDHS 2016 (2%) (16, 17 & 18). However, far less than study done in united state 2011 which was 56% (25). The differences in the study populations may have contributed to the different study findings.

In study the main reasons for not accepting LARC reported by immediate postpartum mothers was using other methods of contraceptive, fear of side effect, want to use LARC other time, religious prohibition and desire to have more children. The reasons for not used was constant with finding in study conducted in Mekelle Town in Ethiopia in 2012, Ethiopian Journal of Health in 2011 and Kampala in Uganda in 2014 (15, 16 & 22).

Contrary to study done in Mekelle in Tigray region 2012, Goba in Oromia region 2012 and Durame in SNNP region of Ethiopia 2014 (18, 22 & 30), in this study increased maternal age and higher educational was not good predictors for determination of current using of LARC methods respectively. A possible explanation was all respondents were discussed and informed about advantage of postpartum contraceptive after interviewed.

Regarding to the number of children, this study revealed that those women who have greater than four children have 2.6 times more likely to use LARCs than those women who have no or only child. This resembles with the study done in Dendi woreda West shewa zone, Oromia region in Ethiopia in 2015, women having four or more children had 5.9 times higher demand for LARC methods compared to women who do not have children at all (29). And also this study is similar with result of study done in Jinka town Southern Ethiopia in 2014, which showed that women who had four or more children had 2.3 times higher demand for LARC methods paralleled to women who didn't have children at all (28). This might be due to for those mothers who have more alive kids more likely counseled about LARC and they might also more concerned.

This study found that women who had completed family size and planning to delay next pregnancy beyond two years also associated with utilization of postpartum LARCs methods. Women who did not desire any more children were nearly two fold more likely to use LARC than women desiring more children in future and the mothers who plan to delay next pregnancy beyond two years were nearly fourfold likely to use LARC methods. This finding was supported by a research done in Mekelle town in northern Ethiopia and study in Jinka in southern Ethiopia (22, 28). A possible explanation was the women who were completed family size more likely concerned about family planning and might be discussed with health workers about the best option of type contraception's.

Ideally, contraceptive counseling for pregnant women begins during the prenatal period, because of women in the immediate postpartum period are typically focused on childbirth recovery and newborn care (13). However, finding from our study only about 27% of mothers were counseled during prenatal visit.

Provider counseling and method initiation before hospital discharge is practical strategy to increase postpartum use of contraceptives, because mothers are already within the health care system and may not return for follow-up postpartum care visits (14, 19).

Finding in our study suggests that prenatal and postpartum contraceptive counseling were determinant for current LARC used. Mothers who were counseled during ANC visits, labor and postpartum period two-fold more likely use LARC methods. Similar to these findings, data

analyzed by Zapata LB, Murtaza S and Whiteman MK in united state, New York State and New York City found that positive associations between prenatal contraceptive counseling and use of contraception postpartum (13).

In this study, those mothers who were experienced any form of LARC method use before, were nearly four times more likely to utilized LARC methods. Among the mothers who had currently used LARC methods, one third (33.5%) of them had ever used the LARC methods before. Similarly, study conducted in Uganda revealed that women who had previously used LARCs were three times more likely to use LARC than those women who have not ever used LARC method (15). Possibly as this mothers known more about LARCs from previous used than ever non-users

Finally monthly higher income, more than four alive kids, completed family size, previously experience of LARC methods, ever counseled about LARCs (during ANC, labor, postpartum) and planning to delay next pregnancy beyond two years were predictors for current LARC use from study result based on multivariable logistic regression analysis ($P<0.05$).

Limitations of study

This study was institutional-based and the respondents were counseled postpartum mothers who came to health facility for obstetrics service. Therefore, the study findings may be not representative for general reproductive women in the community, which is a limitation of the study. Although an effort was made to ensure representativeness of eligible postpartum women in the institution, it does not include all extended postpartum period after hospital discharge. Further detailed investigation for LARC service and determinant factor for utilization during postpartum period should be conducted.

Also this study addressed counseling about advantage of LARC methods in postpartum mothers after obtaining background information about contraception; however the counseling for contraception options is better addressed before delivery, because especially IUCD can be inserted just after post-placental delivery either following vaginal or cesarean delivery. And again the study plan was to involve all candidates' postpartum mothers, but there were some mothers discharged from ward before counseling was made.

CHAPTER SEVEN - CONCLUSION AND RECOMMENDATION

In this study, 53.2% of mothers used LARC method during their immediate postpartum period and implanon was the most preferred method by mothers and the most common reasons reported for not currently using LARC were prefer other methods.

Higher family income**,** more than four numbers of children, complete family size, planning to delay next pregnancy beyond two years, previous LARCs used and counseling on LARC during ANC visits, labor and FP clinic was the main determinants factors for uptake of LARC methods among counseled mothers in immediate postpartum period.

The advantages of postpartum contraceptive use towards wellbeing of mother and child cannot be overemphasized. Based on results of this study, authorities consider continuous providing family planning counseling service during antenatal care visits and delivery services was highly recommended.

And also the prevalence of current LARCs use much higher than most of research done in Ethiopia. It may due to current trained in maternity unit, which includes providing and counseling team for LARC methods. It should be keep it up

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ANNEX I: QUESTIONNAIRE

JIMMA UNIVERSITY

COLLEGE OF PUBLIC HEALTH & MEDICAL SCIENCE POST GRADUATE SCHOOL DEPARTMENT OF GYNAECOLOGY & OBSTETRICS QUESTIONNAIRE FOR LARC METHODS, SELF INTRODUCTION AND INFORMED CONSENT

Greeting

Hello! My name is ----------I am working in research team of Jimma University College of Public health &Medical Science Post Graduate School. This is a study to be conducted with objective of assessing the Prevalence, pattern and determinant factors for postpartum long term contraceptive use.

I would like to inform you that the responses that you provide are very essential, not only, for the successful accomplishment of the study but also for producing relevant information which will be helpful in improving the counseling and delivery family planning services.

Are you willing to assist?

Yes ----------

No ----------

Checklist code number _____

Name of interviewer---------- Sign ---------- Date of interview----------

Name of the supervisor ---------- Sign ---------- Date of interview----------

1. Socio-demographic and economic Characteristics of Respondents

Code	Questions	Response and coding category	go to
101	How old are you?	_____ year	
102	Where is your residence?	1. Urban 2. Rural	
103	What is your religion?	1. Muslim 2. Orthodox 3. Protestants 4. Catholics 5. Others(specify)_____	
104	What is your ethnicity?	1. Oromo 2. Amhara	

		3. Dawro 4. Gurage 5. Others (specify)_____	
105	What is your current marital status?	1. Married 2. Single 3. Divorced 4. Widowed	
106	What is highest education level you have attained?	1. Can't read and write 2. Only read and write 3. Primary school (1-8) 4. Secondary high school (9-12) 5. College or university	
107	What is your occupation?	1. House wife 2. Farmer 3. Merchant 4. Government employee 5. Private institution worker 6. Others(specify)_____	
108	What is your family's monthly income in birr?	_____ birr/ a month	

II. Reproductive history

Code	Questions	Coding categories	go to
201	Total number of parity	_____	
202	Previous pregnancy birth outcome	1. Alive ( ) 2. Stillbirth ( ) 3. Dead ( )	
203	Is the current birth planned?	1. Yes 2. No	
204	Mode delivery of current pregnancy	1. SVD 2. ABD 3. Instrumental 4. Cesarean	
205	Current pregnancy birth outcome	1. Alive 2. Stillbirth 3. ENND	
206	How many live kids do you have?	_____	
207	Do you want to have more babies?	1. Yes 2. No 3. Yet not decided	*If 1, go to 208* *If 2, go to 300*
208	When would you like to have next baby?	_____(In years)	

III. Knowledge and utilization of LARC methods

Code	Questions	Coding Categories	Go To
300	Have you ever heard of LARC?	1. Yes 2. No	*If yes, to 302, 303*
301	Which method(s) have you heard?	1. Implanon 2. Sino-implant/Jadelle 3. IUCD	

302	What is your source of information?	1. Health workers 2. Friends 3. Husband 4. Mass Media 5. Other , specify _____	
303	If source of information is from health worker, when was counseling?	1. During ANC visit 2. During delivery 3. After delivery 4. Other time	*If answer 1, to 304*
304	Total number of ANC visits	_____	
305	Have you ever used LARC method before?	1. Yes 2. No	*If yes, to 306*
306	What method(s) have you used?	1. Implanon 2. Sino-implant/Jadelle 3. IUCD	
307	Why did you stop using the LARC? (*for ever users*)	1. Side effects 2. Desire of pregnancy 3. Religious prohibition 4. Influence by others 5. Other, specify _____	
308	Have you ever heard that the LARC can be inserted immediately after delivery?	1. Yes 2. No	If yes, to 309
309	What is your source of information?	1. Health workers 2. Friends 3. Husband 4. Mass Media 5. Other , specify _____	
310	Would you like to have LARC currently?	1. Yes 2. No	*If no, to 313*
311	Which method do you preferred? (*for current users only*)	1. Implanon 2. Sino-implant/Jadelle 3. IUCD	
312	Reasons of choosing for specific LARC? *(for users of IUCD or Implants*)	_____ _____	
313	Reason for refusal	1. Want more children 2. Religious 3. Concerns of side effects 4. Opposition from partner 5. Others(specify)_____	

ANNEX IV: Approval

ASSURANCE OF PRINCIPAL INVESTIGATOR

The undersigned agrees to accept responsibility for the scientific ethical and technical conduct of the research project and for provision of required progress reports as per terms and conditions of the college of public and medical science in effect at the time of grant is forwarded as the result of this application.

Name of the investigator: _____

Date._____

Signature _____

APPROVAL OF THE FIRST ADVISOR

Name of the first advisor:_____

Date._____

Signature _____

APPROVAL OF THE SECOND ADVISOR

Name of the second advisor:_____

Date._____

Signature _____