Uptake and correlates of long-acting reversible contraceptive use among post-partum women in Ledzokuku-Krowor municipality in Ghana: A facility-based cross-sectional study

Leticia A APPIAH [1], Duah DWOMOH [2*], Ernest T MAYA [3], Agnes M Koto [3], Anthony DANSO-APPIAH [4], Samuel BOSOMPRAH [2], Kwasi TORPEY [3]

[1] *Office of the Executive Director, National Population Council of Ghana, Accra, Ghana;* [2] *Department of Biostatistics, School of Public Health, College of Health Sciences, University of Ghana, Accra, Ghana;* [3] *Department of Population Family and Reproductive Health, School of Public Health, University of Ghana, Accra, Ghana;* [4] *Department of Epidemiology and Disease Control, School of Public Health, University of Ghana, Accra, Ghana.*

Abstract

Background: The unmet need for post-partum family planning globally is around 65%, but in sub-Saharan Africa (SSA), it ranges between 25 and 96%, and 84.5% in Ghana. Long-acting reversible contraceptive (LARC) methods can optimally space births and markedly reduce the high levels of unwanted and or risky pregnancies as well as maternal and child mortality and morbidity. Although they are the most effective, easy, and safe to use after delivery, reports from the Ledzokuku-Krowor Municipality Assembly (LEKMA) show the prevalence of LARC methods is very low among post-partum women.

Objective: This study aimed to determine the prevalence of LARC uptake and assess factors associated with the use of LARC methods in the LEKMA of Ghana.

Methods: A facility-based cross-sectional study using a probability proportionate to size sampling approach was employed to recruit post-partum women within 12 months of delivering a live baby and accessing child welfare clinics in the Government-run health facilities in LEKMA. Secondly, a semi-structured interview guide was administered to sexual and reproductive health workers. The multivariable binary logistic regression model with a robust standard error was used to determine correlates of LARC use.

Results: A total of 406 post-partum women were enrolled in the study. Only 4.1% (n = 16) used LARC, although 59.7% (n = 242) of post-partum mothers had access to LARC methods. The results from the multivariable binary logistic regression model showed adequate knowledge of LARC (adjusted odds ratio = 4.88, 95% CI: 2.64, 26.79, p < 0.05), and age was associated with the odds of uptake of LARC. Interviews with facility managers and other health workers revealed that barriers to uptake of LARC methods include fear of side effects, lack of spousal support, misconceptions about LARC, and lack of adequate knowledge of providers.

Conclusion: There is a high unmet need for contraception among post-partum women. Even though uptake of LARC in the post-partum period in LEKMA is low, it is relatively high among women with adequate knowledge of LARC and in unions (presumably in stable relationships or marriages). Ghana Health Service and the Ministry of Health should make LARC affordable and easily assessable through efficient distribution at the community health post and adequately build the capacity of providers through institutionalised training. There is a need for stakeholders to intensify community-level education geared towards mitigating the barriers to uptake, including myths and misconceptions, and promoting the possible benefits of the use of LARC services.

INTRODUCTION

According to the Royal College of Obstetricians and Gynaecologists report, 2015, it has been estimated that globally, around 222 million women would like to prevent or delay pregnancy but have no access to contraception. The unmet need for family planning is greatest in the post-partum period and represents one of the biggest opportunities to address the challenge of unmet need for family planning [1]. Women normally become susceptible to pregnancy before initiating contraception

* Corresponding author
Email: duahdwomoh@ug.edu.gh

after delivery and may not be aware of the risk of pregnancy before the return of menses[2]. The post-partum period has been identified as a time when the unmet need for contraception is particularly high in developing countries. Also, post-partum women who do not receive LARC immediately are reported to be at an increased risk of repeat pregnancy [3]. Creating wider access to LARC, the most effective contraceptive, can substantially reduce the high levels of maternal mortality and morbidity, as well as unwanted pregnancies and unsafe abortion. In Ghana, Demographic and Health Survey (DHS) data shows that the proportion of women with post-partum amenorrhea dropped from 96% in the first two months after birth to 21% at 12 - 15 months [4]. Thus, the proportion of such women with unmet needs does not take into account women who are considered to have no risks of getting pregnant and, hence, do not need contraception.

Focusing on post-partum family planning (PPFP) is particularly essential in Ghana and West Africa as the length of post-partum insusceptibility keeps declining. This could lead to an increasing proportion of women being at risk of unwanted pregnancy if quality PPFP services are unavailable or inaccessible. Among the numerous family planning methods, LARCs, particularly copper IUDs and hormonal implants, are the most efficacious and cost-effective in the long term [5]. Their failure rates of less than one percent compared to 4.8% for pills makes them superior [6]. The contraceptive failure rate among participants using pills, patches, or rings was 4.55 per 100 participant-years, as compared with 0.27 among participants using long-acting reversible methods [7]. The LARC methods are thus twenty times more effective in preventing unintended pregnancies than other methods [5]. It has a continuation rate of more than 80% and does not require ongoing user effort [8]. Above all, almost all women are eligible [8].

Intrauterine devices (IUDs) are suitable for most post-partum women and can be inserted within 10 minutes of delivery, 48 hours post-partum, and intra-cesarean with a very low expulsion rate [9]. The IUD is an ideal post-partum method because it does not interfere with lactation, facilitates adequate birth spacing, and does not require repeat healthcare visits for contraceptive refills [10]. Additionally, among the numerous family planning methods, LARCs, particularly copper IUDs and hormonal implants, are the most efficacious and cost-effective in the long term [5]. Despite these advantages of LARC, in Ledzokuku-Krowor Municipal Assembly (LEKMA), an urban district in the Greater Accra Region of Ghana, out of 4,824 deliveries in 2015, only 23.3% (n = 1,125) opted for any post-delivery contraceptive. Of the 1,125 contraceptive users, only 2.6% (n = 126) accessed LARC methods.

The purpose of this study is to investigate the major determinants, including motivators and barriers, to the uptake of LARC among post-partum mothers (0 - 12 months) in the LEKMA.

MATERIALS AND METHODS

Study design and sites
The study area (LEKMA) is one of 16 districts in the Greater Accra Region of Ghana. It has a total population of 273,743, projected from the 2010 population of 227,932 (projected from the 2010 census) (GSS, 2014). The study was conducted at three public health facilities, namely, LEKMA Hospital, LEKMA Polyclinic, and Teshie Community Clinic. These facilities were selected because they are the only facilities that offer LARC services in the municipality. A facility-based cross-sectional study design was employed to determine the prevalence and correlates of LARC use as a post-partum family planning method among women of reproductive age in LEKMA.

The target population for this study was all post-partum mothers 0 - 12 months who either delivered or accessed postnatal care in any of the three public health facilities in LEKMA for the period of September to November 2017. The study assessed the level of knowledge and use of LARCs among post-partum women and how respondents' background characteristics influenced them. A structured questionnaire was administered to consenting post-partum women who delivered or attended postnatal care at the three facilities during the period of the study and were enrolled in the sample when they met the inclusion criteria. Systematic random sampling was used to select participants from all three facilities to ensure that the sample fairly represents the target population.

Sample size
The primary objective of the study was to estimate the uptake of LARC. The sample size calculation also allowed for the analysis of risk factors independently associated with the uptake of LARC. The sample size was performed using Cochran's sample size formula for one proportion. In a review of the uptake of LARC among women in low- and middle-income countries (LMIC), Harrison and Goldenberg (2017) found that not more than 15% of post-partum women use LARCThe study further assumed a 95% confidence interval, 4% precision, and a non-response rate of 34%.

The estimated sample size was 412 post-partum mothers 0 - 12 months who either delivered or accessed postnatal care in any of the three public health facilities. Using probability proportionate to the number of deliveries in each facility, a total of 299, 35, and 78 women were respectively interviewed at LEKMA Hospital, LEKMA Polyclinic, and Teshie Community Clinic. Among post-partum women assessing postnatal care from LEKMA, the under-listed formed the basis for inclusion in the study.

- A participant was aged 15 to 49 years
- Had delivered a live baby during the last 12 months
- Accessed postnatal care in any of the three public health facilities at LEKMA
- Has no history of tubal ligation or hysterectomy
- The current partner has not had a vasectomy

Outcome measure

The outcome measure of interest in this study was the uptake of LARC post-partum at the time of the study. It is a binary indicator coded 0 and 1 for non-use and uptake of LARC, respectively.

Independent variables

The following indicators were studied based on the review of literature on LARC uptake: age of the woman, parity, education level, place of residence, marital status, religion, employment, and knowledge of LARC. A respondent was said to have adequate knowledge of LARC if she answered "Yes" to at least 6 of the following 8 knowledge questions: (1) Do you know IUDs can be inserted for post-partum mothers? (2) Do you know Implanon can be inserted for post-partum mothers? (3) Do you know that you can have an IUD inserted directly (10 minutes - 24 hours) after childbirth? (4) Do you know that you can have Implanon inserted weeks after childbirth? (5) Do you know that IUDs give protection for up to 10 years? (6) Do you know that Implanon gives protection for up to 3 years? (7) Do you know that IUD can be removed any time you want to get pregnant? (8) Do you know that Implanon can be removed any time you want to get pregnant?

Statistical analysis

The uptake of LARC was summarised using proportions. In bivariate analyses, Fisher's exact test or Pearson's chi-squared test, as appropriate, was used to examine the associations between each uptake and background characteristics. The 95% confidence interval for the outcome measure was calculated using logit-transformed confidence intervals. A multivariable binary logistic regression model was used to identify factors independently associated with the uptake of LARC. A model was first fitted for each potential explanatory variable to construct a parsimonious model using all the potential explanatory variables. In this model, each variable was a candidate for inclusion in the full model if the p-value for association with uptake was 0.2 or less when considered individually. Variables were then removed from the model if the p-value for the likelihood ratio test was more than 0.2, provided removal did not change the coefficients of variables in the model by more than 10%. Some categories of explanatory variables were combined as appropriate to ensure sufficient numbers for the analyses. All analyses were performed using Stata 15 MP (StataCorp, College Station, Texas, USA).

RESULTS

A total of 406 post-partum women who gave birth or were accessing postnatal care from LEKMA Hospital, LEKMA Polyclinic, and Teshie Community Clinic participated in the study. The average age of the post-partum women was 27 years (interquartile range [IQR]: 25, 30). About half (47%, n = 191) of the mothers had at least secondary education and two-thirds (64%, n = 259) of the respondents resided in Teshie. Eight in every ten post-partum mothers were in a union (married, 47%, n = 190; or cohabiting, 33%, n = 133). The distribution of the background characteristics can be found in Table 1. Table 2 shows the bivariate analysis of factors associated with the uptake of LAR. The bivariate analysis demonstrated that uptake of LARC was highest (16.1%, 95% CI: 6.8 - 33.8) among post-partum mothers of the oldest age group (35 - 44). It was also relatively high among younger post-partum mothers aged 20 - 24 (8%, CI: 3.6 - 16.8) and 16 - 19 (4.6%, 95% CI: 0.6 -27.2). Use declined to less than 2% among post-partum mothers 25 - 29 (1.7%, 95% CI: 0.5 - 5.2) and 30 - 34 (1.1%, 95% CI: 0.2 - 7.5). Though no statistically significant relationship was found, LARC use increased with the number of children alive. LARC use increased from 2.6% (95% CI: 1.2, 5.6) among post-partum women with one child to 8.7% (95% CI: 2.1 - 29.7) among post-partum mothers with at least four children in the bivariate analysis. In bivariate analysis, the use of LARC according to the educational attainment of post-partum mothers suggested the highest LARC users were post-partum women with no education (12.5%, 95% CI: 3.0 - 39.9). Post-partum

Table 1. Characteristics of the study participants

Background characteristics	Number of post-partum women (% of total)
Age (Years)	
Median (IQR)	27 (25, 30)
16-19	24 (6)
20-24	75 (18)
25-29	181 (45)
30-34	94 (23)
35-44	32 (8)
Education	
None	16 (4)
Primary	62 (15)
Middle/JSS	137 (34)
Secondary+	191 (47)
Residence	
Nungua	106 (26)
Teshie	259 (64)
Other	41 (10)
Marital status	
Never married	59 (15)
Living together	133 (33)
Married	190 (47)
Divorced/Separated/Widowed	23 (6)
Religion	
Catholic	27 (7)
Anglican	13 (3)
Methodist	8 (2)
Presbyterian	53 (13)
Pentecostal/Charismatic	258 (64)
Witness/SDA	10 (2)
Islam	17 (4)
Non-religious	5 (1)
Other	15 (4)
Employment status	
Employed	287 (71)
Unemployed	119 (29)
Total	406 (100)

mothers with no education constitute only 4% of the sample, which could explain this unexpected relationship. Among post-partum mothers who were educated, the highest use was among post-partum mothers with middle/JSS education (6.7%, 95% CI: 3.5 - 12.5), lower (2.2%, 95% CI: 3.5 - 12.5) for mothers with secondary or higher education and least among those with primary education (1.6%, 95% CI: 0.8 - 5.7). From the bivariate analysis, the highest uptake of LARC (5.3%, 95% CI: 1.3 - 19.1) was among post-partum women from other places of residence compared to post-partum mothers in Teshie (5.1%, 95% CI: 3.0 - 8.7) and Nungua (1%, 95%, CI: 0.1 - 6.6]). LARC use was higher among post-partum women who were in marital unions. Uptake among post-partum mothers in marital unions was 4.5% (95%, CI: 2.7 - 7.5) compared to uptake of 2.4% (95% CI: 0.6 - 9.3) among post-partum mothers who were not in marital unions. LARC use among post-partum women showed higher use

(17.7%, 95% CI: 5.6 - 43.7) among Muslim mothers compared to post-partum mothers who were either Christian (3.4%, 95% CI: 1.9 - 5.8) or non-religion/other' (5%, 95% CI: 0.7 - 29.4). No variation in uptake of LARC according to employment status was observed in the bivariate analysis. Uptake was nearly the same for employed (4.3%, 95% CI: 2.2 - 7.0) and unemployed (4%, 95% CI: 1.8 - 9.9) post-partum women.

Table 3 shows the results of the multivariable analysis of factors associated with uptake of LARC. The results showed that the odds of use of LARC were significantly associated with adequate knowledge. Post-partum mothers with adequate knowledge of LARC were almost five times more likely to use LARC compared to those without adequate knowledge. While the effect of adequate knowledge on the use of LARC was not significant in bivariate analysis, it attained statistical significance in multivariate analysis when other background factors were

Table 2. Uptake (current use) of LARC by background characteristics

Characteristics	Number of post-partum women	Number (%) currently using LARC	95%CI	Fisher's exact p-value
Adequate knowledge of LARC				
No	127	2 (1.6)	[0.3, 6.1]	0.104
Yes	268	14 (5.2)	[3.1, 8.6]	
Age of child (months)				
<6	320	14 (4.4)	[2.6, 7.3]	1.000
6+	63	2 (3.2)	[0.7, 12.0]	
Age of mother (Years)				
16-19	22	1 (4.6)	[0.6, 27.2]	0.001
20-24	75	6 (8)	[3.6, 16.8]	
25-29	176	3 (1.7)	[0.5, 5.2]	
30-34	91	1 (1.1)	[0.2, 7.5]	
35-44	31	5 (16.1)	[6.8, 33.8]	
Number of children alive				
1	233	6 (2.6)	[1.2, 5.6]	0.12
2-3	139	8 (5.8)	[2.9, 11.1]	
4+	23	2 (8.7)	[2.1, 29.7]	
Education				
None	16	2 (12.5)	[3.0, 39.9]	0.039
Primary	61	1 (1.6)	[0.2, 11.0]	
Middle/JSS	134	9 (6.7)	[3.5, 12.5]	
Secondary+	184	4 (2.2)	[0.8, 5.7]	
Residence				
Nungua	104	1 (1)	[0.1, 6.6]	0.137
Teshie	253	13 (5.1)	[3.0, 8.7]	
Other	38	2 (5.3)	[1.3, 19.1]	
Marital status				
Living together/Married	312	14 (4.5)	[2.7, 7.5	0.541
Never/Divorced/Seperated/Widowed	82	2 (2.4)	[0.6, 9.3]	
Religion				
Christianity	358	12 (3.4)	[1.9, 5.8]	0.024
Islam	17	3 (17.7)	[5.6, 43.7]	
Non-religious/Other	20	1 (5)	[0.7, 29.4]	
Employment status				
Employed	278	11 (4)	[2.2, 7.0]	1.000
Unemployed	117	5 (4.3)	[1.8, 9.9]	
Total	395	16 (4.1)	[2.4, 6.5]	

Table 3. Table 3 shows the results of the multivariable analysis of factors associated with uptake of LARC

Factors	Crude OR [95%CI]	Unadjusted p-value	Adjusted OR [95%CI]	LR adjusted p-value
Adequate knowledge of LARC				
No	1	0.063	1	0.041
Yes	3.44 [0.77, 15.39]		4.88 [2.64, 26.79]	
Age (Years)				
16-19	1	0.004	1	0.014
20-24	1.83 [0.21, 16.04]		2.93 [0.30, 28.31]	
25-29	0.36 [0.04, 3.66]		0.46 [0.04, 4.97]	
30-34	0.23 [0.01, 3.88]		0.22 [0.01, 3.95]	
35-44	4.04 [0.44, 37.28]		2.34 [0.23, 23.88]	
Number of children alive				
1	1	0.184		
2-3	2.31 [0.78, 6.80]			
4+	3.60 [0.68, 18.98]			
Education				
None/Primary	1	0.132	1	0.083
Middle/JSS	1.78 [0.47, 6.77]		1.12 [0.24, 5.17]	
Secondary+	0.55 [0.12, 2.51]		0.26 [0.04, 1.70]	
Residence				
Nungua	1	0.106	1	0.080
Teshie	5.58 [0.72, 43.21]		5.67 [0.69, 46.21]	
Other	5.72 [0.50, 65.02]		11.36 [0.85, 151.68]	
Marital status				
Living together/Married	1	0.376		
Never/Divorced/Separated/Widowed	0.53 [0.12, 2.39]			
Religion				
Christianity	1	0.079	1	0.122
Islam	6.18 [1.56, 24.40]		5.94 [1.23, 28.70]	
Non-religious/Other	1.52 [0.19, 12.29]		0.88 [0.09, 8.34]	
Employment status				
Employed	1	0.885		
Unemployed	1.08 [0.37, 3.19]			

taken into account (p = 0.041). When the effect of age was examined alongside other background characteristics in multivariate analysis, the pattern of use remained the same as in the bivariate analysis. The odds of use were higher among young mothers 20 - 24 years (aOR = 2.9, 95% CI: 0.30 - 28.31) and the oldest post-partum mothers (35 - 44 years) (2.3, 95% CI: 0.23 - 23.88). The odds of use were lower for the remaining age groups relative to post-partum mothers aged 16 - 19 years. This relationship attained statistical significance in both bivariate analysis (p = 0.001) and multivariate analysis (adjusted p = 0.014).

Multivariable analysis indicates higher odds of use among post-partum mothers with middle/JSS education who were 12% more likely to use LARC. The odds of LARC uptake were lower among mothers with at least secondary education (0.26, 95% CI: 0.04 - 1.70). The observed relationship between education and LARC among post-partum women in LEKMA is significant when only the effect of education on LARC is examined at the bivariate level; it was not statistically significant when the net effect of all background characteristics was considered in multivariable analysis. The odds of use increased by six times for post-partum women who were Muslim and almost two times for non-religious/other religious categories

compared to being Christian in the multivariate analysis. The relationship was significant when only the effect of religion was considered in the bivariate analysis but did not attain statistical significance when the net effect of all background characteristics was considered in the multivariate analysis. The multivariable analysis indicated the odds of LARC use were lower (0.5, 95% CI: 0.12 - 2.39) among post-partum women not in marital unions, albeit insignificant.

The synthesis of the key informant interviews involving health workers revealed that some of the barriers to LARC uptake among post-partum women include side effects such as bleeding after Implanon insertion and some misconceptions about LARC such as IUD travelling to other parts of the body after insertion and barrenness after use. Again, the health workers indicated that irregular menses and lack of spousal support also hinder uptake.

DISCUSSION

This study estimated the prevalence of LARC use among post-partum women and identified factors associated with the uptake of LARC. Despite the high perceived need for contraception in the post-partum period because of the

benefits and the generally positive attitude towards LARC, the use is still very low among post-partum women in LEKMA. Only 4% of post-partum women used LARC despite an adequate knowledge rate of 68%. This finding shows a lack of association between intention and healthy behaviour and is consistent with the evidence of the large disparity between demand for and use of contraception (LARC) throughout Ghana and West Africa [11]. The low uptake of LARC among post-partum women reflects both the low uptake of family planning in the post-partum period and the low use of LARC in Ghana. For instance, less than one percent (0.8%) of women in Ghana aged 15 - 49 use IUDs, and 5.2% use implants [4]. Harrison Goldenberg [12] reviewed published literature in low- and middle-income countries (LMIC) about LARC use, and a summary of their findings demonstrates that LARC use varies.

Overall, less than 15% of post-partum women in low and middle-income countries (LMIC) used LARC during the post-partum period. They found that in Nairobi, Kenya's urban slums, LARC methods were the least used during the first year post-partum. Also, only 4% of women opted for implants, and even fewer chose IUDs. In Ethiopia, only 1.8% of those currently using contraception had adopted an IUD, and 0.2% chose an implant. Higher user rates were, however, observed in Malawi (14%). Harrison and Goldenberg, in the same study, observed that studies from Southeast Asia (SEA) show utilisation rates are similar to Sub-Saharan Africa: in Pakistan, not more than 5% of post-partum women chose a LARC, and in India, 2.9% of post-partum women used IUD with none using implants. The low uptake of post-partum family planning observed in LEKMA is, therefore, a pervasive phenomenon that cuts across different countries and regions of the world.

The low use of LARC among post-partum women is partly an outcome of the low use of family planning in the post-partum period in general. For example, Rutaremwa, Kabagenyi [13] found that slightly more than a quarter (28%) of Ugandan women aged 15 - 49 used a modern method of contraception in the post-partum period, but since their study was not limited to only LARC, it follows that use of LARC will be much lower. Also, Gebreselassie and Rutstein [14], in a comparative study among four countries (Kenya, Indonesia, the Dominican Republic, and Peru), discovered that 20% to 40% of mothers in the post-partum period did not use any contraceptive method after they became susceptible to pregnancy (two in five women in Kenya, one in four in the Dominican Republic, and one in five in Indonesia and Peru). It was found that among sampled post-partum women who had brought their children for the second dose of measles vaccine between 18 and 24 months in a County referral hospital in rural Kenya, post-partum family planning was relatively high. More than four in five (86.3%) of these women used contraceptives within one year of delivery. However, the use of LARC was lower: LARC: 24.1% for IUD and 14.2% for Implanon. Thus, even where family planning use is high in the post-partum period, the use of LARC methods is generally lower. This situation presents the opportunity to increase LARC use in the post-partum period because these women may not be opposed to family planning (because they may already be using a short-acting method). Therefore, making LARC methods available in health facilities and addressing challenges related to access and misconceptions has the potential to increase LARC uptake among post-partum women. Among the background factors used in this study, knowledge of LARC and the age of post-partum women are the factors significantly associated with LARC use among post-partum women in LEKMA. Education and religion have a significant association in the bivariate analysis but do not attain statistical significance at the multivariate level. However, the lack of statistical significance for most variables when the multivariate analysis is applied may be due to the sample and/or the low uptake of post-partum family planning (number of cases with the outcome of interest - the dependent variable).

LARC uptake is the behaviour of interest that is to be influenced when the theory of planned behaviour (TPB) is applied. In this case, adequate knowledge and age are the two background factors that directly affect the behaviour of LARC uptake. Knowledge was found to be significantly associated with the use of family planning among post-partum women in LEKMA. Post-partum women with adequate knowledge of LARC were more likely to use any of the methods than those without adequate knowledge. Generally, adequate knowledge dispels myths associated with family planning in general and LARC in particular. One recognised inhibitor of the use of family planning services, even where services are available, is the lack of knowledge. This finding is consistent with several studies in sub-Saharan Africa that have shown an association between knowledge and family planning, although the measurement of knowledge differed among different researchers[15]. The study by Anguzu Tweheyo [15] realised knowledge and attitudes towards the use of LARC influenced use among women in the Lubaga division of Kampala district in Uganda. These studies used women's mass media exposure as a proxy for knowledge of post-partum family planning, and they found a significant association between knowledge of post-partum family planning and uptake.

One unique feature of this study, however, is the direct measurement and use of adequate knowledge as a predictor of LARC use. This finding from the application of the theory in this study reveals that knowledge is one of the background factors that can directly affect behaviour change (LARC uptake). This is particularly relevant in Sub-Saharan Africa, with low contraceptive prevalence and a high unmet need for family planning. This implies that uptake of LARC in LEKMA can be raised by increasing knowledge of post-partum women through the provision of IEC on post-partum family planning and the use of LARC, and this should be implemented in LEKMA and the rest of the country because uptake of LARC in the post-partum period significantly reduces unintended and closely spaced

pregnancies and attendant complications. LARC was also significantly the highest among the younger age group (20 - 24) and higher among post-partum mothers of the oldest age group (35 - 44) compared to post-partum mothers of the youngest age group (16 - 19). It was expected that women of older ages and of higher parity would be more inclined to use LARC or stop births. However, because of cultural issues related to adopting permanent methods, these women would rather use LARC due to the longer protection provided. This is demonstrated by the high likelihood of LARC uptake among older mothers compared to young mothers. This finding is consistent with that of Gebreselassie and Rutstein [14], who found increased use of PPFP among older mothers (35+) in Indonesia, the Dominican Republic, Peru, and Kenya in a four-country study. These findings suggest that behavioural change can be achieved when attitudes are predisposed to dynamism, as in the case of young post-partum mothers, or when driven by need, as with older post-partum mothers. However, a contrasting finding was made in Uganda by Rutaremwa et al. (2015) between age and LARC, where the increase in age significantly reduced the use of LARC.

The higher odds of use among relatively young mothers (20 - 24) in LEKMA could be due to higher educational attainment among these mothers, which is known to affect LARC use positively. The odds of use among post-partum mothers aged 25 - 29 years and 30 - 34 years are lower than among teenage mothers, and this is surprising because adolescents are known to be among the categories with the highest unmet needs. The reason for this result is not immediately apparent and requires further investigation. The remaining independent variables (number of children alive, education, residence, marital status, and religion) were not found to be statistically significant. Whilst the number of children alive did not attain significance with post-partum LARC use, its effect was in the expected direction, with the likelihood of use increasing with the number of children alive. At higher parity, mothers are expected to reach desired family sizes and hence have higher motivation to limit childbearing. The lack of significant association between education and LARC uptake in the post-partum period, as well as the negative relationship with higher education, is not supported by many studies. The general expectation and common finding is a positive association between education and LARC [16,17].

Conclusion
In this study, there was a low uptake of LARC among post-partum women in LEKMA despite relatively high access to LARC services. The age of the post-partum mother and knowledge of LARC contributed significantly to the use of LARC among post-partum women. The government should institutionalise the capacity-building of service providers and collaborate with civil society organisations to intensify community-level education to increase the uptake of LARC.

DECLARATIONS

Ethical consideration
The study protocol was approved by the Ghana Health Service Ethical Review Committee. (GHS-ERC: 04/03/2017), permission was sought from the Greater Accra Regional Health Directorate and head supervisors at the research sites. Women were moved to a private space, where the purpose, objectives, and significance of the study were explained to them. Any possible risks associated with the study were explained to them. They were assured of confidentiality, privacy, and anonymity. It was explained to them that their identities and the information they provided would remain confidential and not be shared with anyone. Any other concerns of respondents regarding the study were answered. A signed informed consent sheet was obtained from those who participated.

Consent to publish
All authors agreed on the content of the final paper.

REFERENCES

1. Ross JA, Winfrey W (2001) Contraceptive use, intention to use and unmet need during the extended post-partum period. International family planning perspectives. 20-27

2. Blazer C, Prata N (2016) Post-partum family planning: current evidence on successful interventions. Open Access J Contracept .:53-67

3. Baldwin MK, Edelman AB (2013) The Effect of Long-Acting Reversible Contraception on Rapid Repeat

Pregnancy in Adolescents: A Review. Journal of Adolescent Health 52:S47–S53

4. GSS, GHS, & ICF. (2015). Ghana Demographic and Health Survey 2014. : GSS, GHS, and ICF International. Retrieved from Rockville, Maryland, USA

5. Winner B, Peipert JF, Zhao Q, Buckel C, Madden T, Allsworth JE, Secura GM (2012) Effectiveness of Long-Acting Reversible Contraception. New England Journal of Medicine 366:1998–2007.

6. Trussell J (2004) Contraceptive failure in the United States. Contraception 70:89–96

7. Buckel C, Maddipati R, Goodman M, Peipert J, Madden T, et al. (2019) Effect of staff training and cost support on provision of long-acting reversible contraception in community health centers. Contraception 99:222-227

8. Likis FE (2014) A New Year's Resolution: Promoting Long-Acting Reversible Contraception. J Midwifery Womens Health 59:1–2

9. Kittur S, Kabadi Y (2012) Enhancing contraceptive usage by post-placental intrauterine contraceptive devices (PPIUCD) insertion with an evaluation of safety, efficacy, and expulsion. International Journal of Reproduction, Contraception, Obstetrics Gynecology, 1:26-33.

10. Weston MRS, Martins SL, Neustadt AB, Gilliam ML (2012) Factors influencing uptake of intrauterine devices among post-partum adolescents: a qualitative study. Am J Obstet Gynecol 206:40.e1-40.e7

11. Eliason S, Baiden F, Quansah-Asare G, Graham-Hayfron Y, Bonsu D, Phillips J, Awusabo-Asare K (2013) Factors influencing the intention of women in rural Ghana to adopt post-partum family planning. Reprod Health 10:34.

12. Harrison MS, Goldenberg RL (2017) Immediate post-partum use of long-acting reversible contraceptives in low- and middle-income countries. Matern Health Neonatol Perinatol 3:24

13. Rutaremwa G, Kabagenyi A, Wandera SO, Jhamba T, Akiror E, Nviiri HL (2015) Predictors of modern contraceptive use during the post-partum period among women in Uganda: a population-based cross-sectional study. BMC Public Health 15:262.

14. Gebreselassie T, Rutstein SO, Mishra V (2008). Contraceptive use, breastfeeding, amenorrhea and abstinence during the post-partum period: an analysis of four countries: Marco International Incorporated

15. Anguzu R, Tweheyo R, Sekandi JN, Zalwango V, Muhumuza C, Tusiime S, Serwadda D (2014) Knowledge and attitudes towards use of long-acting reversible contraceptives among women of reproductive age in Lubaga division, Kampala district, Uganda. BMC Res Notes 7:153

16. Jalang'o R, Thuita F, Barasa SO, Njoroge P (2017) Determinants of contraceptive use among post-partum women in a county hospital in rural KENYA. BMC Public Health 17:604

17. Credé S, Hoke T, Constant D, Green MS, Moodley J, Harries J (2012) Factors impacting knowledge and use of long acting and permanent contraceptive methods by post-partum HIV positive and negative women in Cape Town, South Africa: a cross-sectional study. BMC Public Health 12:197

Thank you for publishing with

HSI Health Sciences Investigations Journal