STROBE Statement- Checklist of items that should be included in reports of *case-control studies*

| | Item No | Recommendation |
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| **Title and abstract** | 1 | (*a*) Determinants of Long Acting Reversible Contraceptive Methods Utilization among married women of reproductive age group in Ambo town, Oromia region, West Ethiopia,  2016: A case control study |
| | | (*b*) Community based unmatched case control study was conducted in Ambo town among married women of reproductive age group. 140 users and 280 non-users were randomly included. Bivariable and multivariable logistic regression were used to identify candidate variables and independent predictor variables respectively. Adjusted odds ratios together with their corresponding 95% CI were calculated to assess strength of association and statistical significance. |
| | | 139 users and 279 non-users were interviewed giving a response rate of 99%. |
| | | Moderate level of knowledge on long-acting reversible contraceptive methods (AOR= 8.73, 95%CI: 3.08 - 24.77), Good level of knowledge (AOR=13.99, 95%CI: 4.93-39.71), spousal discussion on long-acting reversible contraceptive methods (AOR=2.88, 95%CI: 1.3-6.36), positive attitude toward long-acting reversible contraceptive  methods (AOR=7.07, 95% CI: 3.77-13.24), Women from households in the poorest wealth quintile (AOR= 6.83, 95%CI: 2.68-17.38), Women from households in the medium wealth quintile (AOR=5.83, 95%CI: (2.23- 15.23) were positive determinants ,whereas intention to give birth in the future (AOR=0.09, 95%CI: 0.02- 0.36) and  woman's expectation of restriction to methods use (AOR=0.2, 95%CI: 0.08- 0.48) were negative determinants of long-acting reversible contraceptive methods utilization. |

**Introduction**

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| Background/rationale | 2 | Long-acting reversible contraceptive methods are the most effective to prevent pregnancy, convenient, cost-effective for programs over time, this in turn help governments to save related costs and enhance in achieving the national and international health set targets as compared to other methods. Two of the LARC methods are Implants and Intrauterine device (IUD) and they prevent pregnancy for up to 3 to 7 years and 10 to 12 years respectively. Provision of the LARC methods helps women or couples who want to space or limit their pregnancies by having more choices. The use of long-acting reversible contraceptive methods can also enhance improvements in the health and well-being of entire families in various many ways. Once either method is removed, women's fertility returns almost immediately (1). |
| | | Long-acting reversible contraceptive methods are the most effective (>99%) methods of contraceptives and are relatively safe and convenient. During one year of typical use, LARC methods are 3 to 60 times more effective than most short-acting contraceptive methods. The long term nature of these forms of contraception does not require daily motivation on the part of users and thus have higher continuation and effectiveness rates. Couples also require fewer visits to health providers, thus saving time, effort and money and the patient load at health care facilities gets lessened (1). |
| | | Though LARC methods have a vital role, they are given in few health care facilities, remain relatively low in coverage and were not included as part of programs in the majority of national reproductive health and family planning programs. More than 350 million couples worldwide have limited or no access to effective and affordable FP, especially to LAPMs. Strong family planning programs provides a full range of contraceptive methods, but in many places, LAPMs are the least available, the least |

used and possibly the least understood methods by clients (1, 7).

So far, most studies conducted on determinants of LARC methods utilization were concentrated more on identifying determinants related with socio-demographic, reproductive health factors and which is not enough to depict the full picture of the determinants of LARC methods utilization. Attitude, income, and level of knowledge on LARC methods could also be important categories of determinants where most previous studies were fail to consider.

The finding of the study could help program managers, different stakeholders, and policy makers by providing important information to enhance the utilization of long-acting reversible contraceptive methods among married women of reproductive age group.

The prevalence of LARC methods utilization among married women in Ambo town is 5%, which is comparatively low as compared to the regional and national targets. The majority of married women in the town are not using LARC methods and even those who are using modern contraceptives were relying on SAFPMs (18). Therefore, this study was aimed to identify determinants of long-acting reversible contraceptive methods utilization among married women of the reproductive age group in Ambo town, Oromia region, west Ethiopia.

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| Objectives | 3 | • To determine socio-demographic related determinants of long-acting reversible contraceptive methods utilization<br><br>• To identify reproductive health related determinants of long-acting reversible contraceptive methods utilization<br><br>• To identify individual related determinants of long-acting reversible contraceptive methods utilization<br><br>• To determine health facility related determinants of long-acting reversible contraceptive methods utilization |

**Methods**

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| Study design | 4 | A community based unmatched case control study design was conducted to identify determinants of long acting reversible contraceptive methods utilization among married women of reproductive age group in Ambo town, Oromia region, West Ethiopia. |
| Setting | 5 | The study was conducted from May 01-30/2016 in Ambo town, Oromia Regional State, located at 110 km distance on the west of Addis Ababa which is the capital city of the country. The town has six administrative kebeles. The total population of the town for the year 2016 was estimated to be 79, 059 (18).<br>The proportion of women in childbearing age was 22.2 %( 17,551) of the population. The town has one General Hospital, two public health centers, two higher and three medium private clinics that provide LARC methods service as an integral component of other health care services (Fig 1).<br>All these facilities in the study area are providing LARC methods services for free and the national government is making these methods available. |
| Participants | 6 | (*a*) Users were married women who were using of one of long-acting reversible contraceptive methods and non-users were married women who were not using any of modern contraceptive methods. Users and non-users who were lived at least for six months in the study area were included in the study. |

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| Variables | 7 | Variables included in this study were: Socio-demographic and economic variables which comprises age, education, occupation, income; reproductive health related variables which comprises number of parity, number of living children, sex composition of living children, history of still births, history of induced abortion, intention to give birth in the future; individual related variables which comprises knowledge of LARC methods, attitude toward LARC methods utilization, inter-spousal discussion, responsible person to limit number of children and source of information and Health facility related variables which comprises distance, expectation of availability of method mix and expectation of restriction to method use. |
| Data sources/ measurement | 8* | Knowledge of the respondents on LARC methods was measured by the total number of correct answers to 11 items on knowledge questions, with a minimum score of 0 and maximum of 11. Those who scored 80% and above were declared as having good knowledge, those who scored 50-79% were declared as having moderate knowledge and those who scored less than 50% were declared as having poor knowledge. |
| | | Attitude of the respondents toward LARC methods was measured by likert scale type questions. This was measured by the total number of correct answers from fifteen attitude questions toward LARC methods and the mean score of these answers was computed. Then respondents were declared as having positive attitude and negative attitude. Those who scored above mean to the correct answers from attitude measuring LARC methods questions were considered as having positive attitude and those who scored mean and below mean to the correct answers from attitude measuring LARC methods questions were considered as having negative attitude (26). |
| | | Wealth index was computed as a composite indicator of living standard based on variables related to ownership of selected household assets, presence of livestock and materials used in the house. Variables that used to measure wealth index at household level were piped water source, flush toilet piped to sewer system, electricity, separated room for sleeping, separated room for cooking, refrigerator, mobile phone, fixed phone line, radio, electrically working griddle, own home, cement roof type, vehicle, and livestock. The computation was made using principal component analysis (PCA) and composite variables were extracted by summing up the principal components into three components. The adequacy of the model for PCA was checked by the value of Kaiser-Meyer-Olkin measure of sample adequacy (KMOSA) and it became 0.78 and the sample was adequate. Eigen values were used to decide the number of PCs to be retained. Only PCs with Eigen values greater than 1.0 were retained. Three components explained the wealth index with the overall cumulative variance percentage of 69.4%. Detection of outliers & inter-item consistency was performed. To check inter-item consistency, Chronbach alpha of factor lodgings were computed and the value was 0.82. Also, Quintiles of the wealth index were computed. |
| Bias | 9 | Data collectors and supervisors were trained adequately |
| Study size | 10 | The sample size was determined by using EpiInfo software version 7.1 with an assumption of 95% confidence interval, power 80%, Case to control ratio 1:2; with inter-spousal discussion as exposure variable, 93.6% of cases and 83% of controls with exposure, Odds ratio of 3.0 (24) and 10% non-response compensation in both groups. Accordingly, 140 cases and 280 controls were included in the study. |

| Quantitative variables | 11 | Data were coded manually, and checked for completeness and consistency. Then data were entered and cleaned by Epi Data version 3.1 and exported to SPSS version 21.0; where recoding, computing and other statistical analysis were performed. Descriptive statistics were computed to explore frequency distribution, central tendency, variability (dispersion) and distribution of outcome and explanatory variables. Bivariable analysis was conducted in order to identify candidate variables (P-value less than 0.25) for multivariable logistic regression. Finally, multivariable logistic regression was fitted using standard enter method to identify independent predictors of LARC methods utilization. Hosmer and Lemeshow goodness of fit test were used to assess model fitness (P-value = 0.02). In multivariable logistic regression, adjusted Odds Ratios together with its 95% Confidence Interval was computed for variables maintained in the final model and statistical significance was declared by the confidence interval. |
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| Statistical methods | 12 | (*a*) Confounders were tried to be controlled |
| | | (*b*) Interaction among variables was checked and no interaction has been detected |

**Results**

| Participants | 13* | (a) Of the sample women 139 users and 279 non-users were enrolled in the study, giving a response rate of 99% in both groups. |
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| | | (b) One case and one control were busy to be interviewed. |
| Descriptive data | 14* | (a) The mean age of overall respondents enrolled in the study was 28.6 years with a standard deviation of 5.7 years; with a minimum age of 15 and a maximum age of 44 years. The mean age of users and non-users were 28.0 years (SD=6.34 years) and 27.84 years (SD=5.74 years) respectively. The majority of users and non-users were in the age range of between 25- 34 years (Table 1). |
| | | About 91(65.5%) users and 195(69.9%) non-users were Oromo by Ethnicity and 82(59.0) users and 145(52.0) non-users were Orthodox Christian/Eastern Orthodox by religion (Table1). |
| Outcome data | 15* | Regarding other individual related characteristics, 87.8% of users and 63.6% of non-users had a discussion with their husbands on long-acting reversible contraceptive use. Based on LARC methods knowledge assessment 77(55.4%) users and 99(35.5%) non-users had good knowledge on LARC methods, 54(38.8%) users and 110(39.4%) non-users had moderate knowledge on LARC methods (Table 2). The mean score of an attitude of the respondents was 49.43(SD=7.8). 106(76.3%) of users and 107(38.4%) of non-users had a positive attitude; whereas the rest of the users and non-users had a negative attitude towards LARC methods utilization (Table 2). |
| Main results | 16 | (*a*) Moderate level of knowledge on long-acting reversible contraceptive methods (AOR= 8.73, 95%CI: 3.08 - 24.77), Good level of knowledge (AOR=13.99, 95%CI: 4.93-39.71), spousal discussion on long-acting reversible contraceptive methods (AOR=2.88, 95%CI: 1.3-6.36), positive attitude toward long-acting reversible contraceptive methods (AOR=7.07, 95% CI: 3.77-13.24), Women from households in the poorest wealth quintile (AOR= 6.83, 95%CI: 2.68-17.38), Women from households in the medium wealth quintile (AOR=5.83, 95%CI: (2.23- 15.23) were positive determinants ,whereas intention to give birth in the future (AOR=0.09, 95%CI: 0.02- 0.36) and woman's expectation of restriction to methods use (AOR=0.2, 95%CI: 0.08- 0.48) were negative determinants of long-acting reversible |

| | | contraceptive methods utilization. |
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| Other analyses | 17 | Interaction among variables was checked and no interaction has been detected |

**Discussion**

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| Key results | 18 | Wealth index, spousal discussion, level of knowledge and attitude positive determinants; whereas intention to give birth in the future and expectation of restriction to method use at health facility were negative determinants of LARC methods utilization. |
| Limitations | 19 | Minimal recall bias as exposures was asked retrospectively. However, it was tried to be minimized by provision of adequate training for data collectors and supervisors. |
| Interpretation | 20 | The results from multivariable logistic regression showed that wealth index, spousal discussion, level of knowledge and attitude positive determinants; whereas intention to give birth in the future and expectation of restriction to method use at health facility were negative determinants of LARC methods utilization. |
| | | The spousal discussion was the independent predictor of LARC methods utilization. The odds of LARC utilization was about three times higher among women who discussed contraceptives with their partners than those women who did not discussed (AOR=2.88, 95% CI: 1.3- 6.36). |
| | | The level of knowledge was another independent predictor of LARC methods utilization. The odds of LARC utilization was about 9 and 14 times higher among women who had moderate and good knowledge on LARC methods than those women who had poor knowledge respectively (AOR=8.73, 95% CI:3.08-24.77, and AOR =13.99, 95% CI:4.93- 39.71). |
| | | The positive attitude of the respondent was also another independent predictor of LARC methods utilization. The odds of LARC utilization was about seven times higher among women who had a positive attitude than those women with a negative attitude (AOR= 7.07, 95% CI: 3.77-13.24) |
| | | Intention to give birth in the future was another independent predictor of LARC methods utilization. The odds of LARC utilization was about 91% less among women who intended to give birth in the future compared to those women who were not intended to give birth (AOR=0.09 95% CI: 0.02- 0.36). |
| | | Wealth index was another independent predictor of LARC methods utilization. The odds of LARC utilization was about seven times higher among women from households in the poorest wealth quintile than those women from households in the richest wealth quintile (AOR= 6.83 95%CI 2.68- 17.38). Similarly, the odds of LARC utilization was about six times higher among women from households in the medium wealth quintile than those women from households in the richest wealth quintile(AOR=5.83, 95%CI: 2.23- 15.22). |
| | | This study finding also depicted that expectation of restriction to the method used at the health facility was an independent predictor of LARC utilization. |
| | | The odds of LARC utilization was about 80% less among women who expected restriction to method use at health facilities compared to those women who didn't expect. (AOR=0.2, 95%CI: 0.08- 0.48) |
| Generalizability | 21 | The study results are generalizable |

**Other information**

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| Funding | 22 | The source of fund for this research work was only Jimma University. The funding institution has no role in the design, data collection, data analysis and interpretation and manuscript writing. |

*Information has been given for cases and controls, separately!