RESEARCH ARTICLE

Magnitudes of post-abortion family planning utilization and associated factors among women who seek abortion service in Bahir Dar Town health facilities, Northwest Ethiopia, facility-based cross-sectional study

Amsalu Muchie¹, Fentie Ambaw Getahun², Yibeltal Alemu Bekele³*, Tsion Samual⁴, Tebkew Shibabaw⁴

¹ Felege Hiwot Referral Hospital, Bahir Dar, Ethiopia, ² School of Public Health, Bahir Dar University, Bahir Dar, Ethiopia, ³ Department of Reproductive Health and Population Studies, Bahir Dar University, Bahir Dar, Ethiopia, ⁴ Department of Environmental Health, Bahir Dar University, Bahir Dar, Ethiopia

* yibeltalemu6@gmail.com

Abstract

Introduction

Globally an estimated 55.9 million abortions occur each year. The majority of abortions occur due to unintended pregnancies, which is a result of the non-use of family planning methods. World health organization recommends all clients to utilize modern contraceptive methods after any abortion procedure. However, post-abortion family planning utilization is still low in Ethiopia including the study area. Therefore, this study was expected to determine the utilization of post-abortion family planning and associated factors in Bahir Dar city health facilities in Northwest Ethiopia.

Method

Institution based cross-sectional study was conducted among 408 women from March 1 to April 30, 2019. Data were collected through face-to-face interview using a structured and pre-tested questionnaire. Systematic random sampling was used to select the study participants. Data were cleaned, coded, and entered into epi data and exported to SPSS for further analysis. Both bivariable and multivariable logistic regression were employed. Those variables that had a p-value of less than 0.2 during the bivariate analysis were retained for the multivariable analysis. P-value and confidence interval were used to measure the level of significance on multi-variable analysis and those variables whose P-value, less than 0.05 was considered as statistically significant.

Results

The finding of this study showed that the magnitude of post-abortion family planning (PAFP) utilization was 61% with 95% CI (55, 65). Secondary education level(AOR, 4.58; 95% CI
(1.96, 10.69)), certificate and above education level (AOR, 3.06; 95% CI (1.32, 7.08)), Manual Vacuum Aspiration (MVA) (AOR, 7.05; 95% CI (2.94, 16.90)), both medication and Manual Vacuum Aspiration (AOR, 5.34; 95% CI (2.56, 11.13)) and received Post Abortion Family Planning (PAFP) counseling (AOR, 5.99; 95% CI (3.23, 11.18)) were significantly associated with PAFP utilization.

**Conclusion**
Post-abortion family planning utilization in Bahir Dar health facilities was low compared with the national figure. Secondary and above educational level, respondents who were managed by Manual Vacuum Aspiration (MVA), both Manual Vacuum Aspiration (MVA) and medication and receiving Post Abortion Family Planning (PAFP) counseling were predictors of post-abortion family planning service utilization.

**Introduction**
Post-abortion family planning(PAFP) is the initiation and use of family planning methods immediately after an abortion [1]. It is the part of abortion care service which increases contraceptive use prevalence and reduces unintended pregnancies and unsafe abortion [2]. The WHO guideline recommends a woman to wait at least six months after an abortion before getting pregnancy. This is important for her body time to regain its strength and prepare for healthy pregnancy [3].

Globally an estimated 55.9 million abortions occur each year. The majority (49.3 million) abortions occur in developing countries [4]. Unsafe abortion is preventable but it still causes 13% of maternal deaths and 20% of the overall burden of maternal death and long-term disability [13]. In Ethiopia, an estimated 620,300 induced abortions were performed in 2014 with an annual abortion rate of 28 per 1,000 women [5].

Studies conducted in developing countries showed that the prevalence of post abortion family planning utilization were 73%, 73%, 81%, and 97.7% in Africa and Asia, Pakistan, India and Brazil respectively [6–9]. Similar studies conducted in Sub-Saharan countries showed that the prevalence of post abortion family planning utilization ranges from 55.7% to 76% [10, 11]. Previous studies conducted in different parts of Ethiopia also showed the prevalence of post abortion family planning utilization were 47.5%, 56.5%, 59.2%, and 70% in Dessie Town, Gurage Zone, Debre Markos Town, and Jimma Town respectively [12–14].

According to different studies conducted in the developing countries, age, marital status, educational level, type of health facility, level of health facility, method mix, sex preference of health care provider, the desire of having more children, parity, gravidity, partner refusal, women accompanied by their partner, previous live birth, fear of side effects, and lack of adequate information determined post-abortion family planning utilization [12, 15–21]. Similarly, different studies in Ethiopia showed age, marital status, fear of side effect, availability of the contraceptive method, previous history of abortion, knowledge about family planning, misconception about contraceptive determined post-abortion family planning utilization [22–24].

Currently, the government of Ethiopia is committed to achieving the Sustainable Development Goal 3 (SDG-3) that promise to end all preventable causes of maternal death through providing effective maternal health care services [25, 26]. It is recognized that providing post-abortion family planning services for women minimize the risk of pregnancy-related problems. In addition, the government of Ethiopia implemented the new health sector transformation plan...
(HSTP) that aimed to improve the uptakes of maternal health care services utilization. One of the focus areas is expanding the infrastructure for providing post abortion family planning services since 2015/16 [21]. However, there is paucity of evidence that indicates the magnitude of post-abortion family planning services and its associated factors in Ethiopia after the implementation of the HSTP including the study area. So the aim of this study was to determine the magnitude and associated factors of post-abortion family planning service.

Methods

Study area and design

This study was carried out in Bahir Dar town, North West Ethiopia. Bahir Dar is the capital city of the Amhara regional state. It is located around 565 km far from the Ethiopian capital, Addis Ababa. In the city, there are two government hospitals, five government health centers, two higher privat clinics, and one private reproductive health-based clinic that are providing abortion care services. Institutional based cross-sectional study was conducted from March 1 to April 30, 2019. All women who were seeking abortion care service in Bahir Dar city health facilities were the source population. All women who came for abortion care services during the study period were included in this study while women who were critically ill and showed any sign of infection excluded in this study.

Sample size and procedure

The sample size was calculated using a single population proportion formula by considering the following assumption; according to a study conducted in Debre Markos Town, the proportions of post-abortion family planning service utilization was 59.2% [27]. With a 95% confidence interval, 5% margin of error, and 10% none response rate. Therefore, a total of 408 women who received abortion care services were included in this study.

All public and private health institutions (a total 10 governmental health facilities and 4 private health facilities) which are providing abortion care service found in the town were selected. All selected health care facilities provided both legal abortion services based on the country law and emergency post abortion care services for those who need the service. The participants were proportionally allocated to each health facility based on last year’s client flow of abortion care services performance. Finally, systematic random sampling was used to select the study participants in each health care facility.

Study variables

   Dependent variables. Post-abortion family planning utilization (Yes/No).
   Independent variables. Socio-demographic related factors. Age, monthly income, religion, marital status, occupation, family support, and educational status
   Reproductive and abortion management-related factors. gravidity, parity, the desire of children, previous abortion, surgical abortion, medical abortion, and gestational age.
   Facility and provider related factors. Type of health institution, level of health institutions, PAFP counseling, availability of the contraceptive, sex of the provider, method mix, and communication.
   Personal and family planning method factors. Knowledge, request for service, information about family planning methods, and family planning side effects.

Operational definition

Knowledgeable. Seven questions were used to measure knowledge about post-abortion modern contraceptive uses. Respondents who answered the mean and above among seven
knowledge related family planning questions were considered as “knowledgeable” about post-abortio
on modern contraceptive uses while respondents who answered below the mean knowledge related family planning questions were considered as “not knowledgeable” [20].

Data collection procedure and tools
Data were collected through a structured questionnaire developed by reviewed different litera
ture via interviews. The questionnaire was first prepared in English and translated to local lan-
guage Amharic and then translated back to English to check the consistency. The ques-
tionnaire was comprised of socio-demographic characteristics, individual-related charac-
teristics, reproductive health-related and facility-related characteristics. Five BSc nurses were
assigned for data collection and one MSc holder nurse was assigned to supervise during the
whole data collection process.

Data quality control
Pre-test was conducted on 10% [41] respondents in Finote Selam Hospital. One day training
was provided for data collectors and the supervisor on the objective, and the relevance of the
study. The supervisor managed the data collection process every day, and the principal investiga-
tor also checked the completeness of the questionnaire every day.

Data processing and management
Data were cleaned, coded, and entered into Epi data version 3.1 and exported to SPSS version
23 for further analysis. Descriptive statistics were carried out to see the distributions of inde-
dependent variables. Both bivariable and multivariable logistic regression analysis were
employed. On bivariable analysis p-value of less than 0.2 was used to select candidate variables
for multivariable analysis. P-value and 95% confidence interval were used to measure the level
of significance on multivariable analysis and those variables with a P-value of less than 0.05 on
multivariable analysis were considered as statistically significant.

Ethical statement
Ethical clearance was obtained from the Ethical review board of Bahir Dar University, College
of Medicine and Health Sciences. A support letter was received from Amhara public health
institute and Bahir Dar city administration health office.

Written consent was taken for every participant and based on their agreement the data col-
lection took place. Consent was taken from their guardian for women whose age less than 18
years. Information was provided for all participants about the objective, the purpose and the
contents of the study as well as their rights to refusal at any time of data collection. The partici-
pants were also reassured how to handling and uses of the data.

Result
Socio-demographic characteristics
A total of 408 respondents participated in this study with a response rate of 100%. One hun-
dred fifty-six (38.2%) respondents were in the age group of 25 to 29 with the mean age of 26.23
and SD of ±4.75. Two hundred forty (58.8%) respondents were married. Three hundred
thirty-six (82.6%) respondents were Orthodox religion followers and 72(17.4%) respondents
were Muslims. Three hundred ninety (95.6%) respondents were from Amhara and 18(4.4%)
were from Agew ethnic groups. Eighty-four (20.6%) respondents did not attend formal
education while 118 (28.9%) respondents attended secondary education. Three hundred fifteen (77.2%) respondents were living in rural areas (Table 1).

**Reproductive hearth related characteristics**

One hundred eighty-three (44.8%) respondents have prim-gravidity. Thirty-six (8.8%) respondents have had a history of previous abortion. Three hundred thirty-eight (82.8%) respondents desire to have additional children for the future. Two hundred forty-two (59.3%) respondents come with spontaneous abortion. Two hundred eighty-three (69.4%) respondents received post-abortion family planning counseling before they left the health institution and 144 (35.3%) of them got individual counseling (Table 2).

**Magnitudes of post abortion family planning utilization**

The magnitude of post abortion family planning utilization in the study area was 249(61%) with 95% (CI: 55.0, 65.0). Two hundred eighty-two (69%) respondents were received abortion

| Table 1. Socio-demographic characteristic of respondents in Bahir Dar town, Amhara region, Northwest Ethiopia, 2019. |
|---------------------------------------------------------------|
| **Variables** | **Frequency** | **Percent (%)** |
| **Age** | | |
| 15–19 | 19 | 4.7 |
| 20–24 | 135 | 33.1 |
| 25–29 | 156 | 38.2 |
| 30–34 | 61 | 15 |
| ≥ 35 | 37 | 9.1 |
| **Marital status** | | |
| Single | 141 | 34.5 |
| Married | 240 | 58.8 |
| Other (widowed and divorced) | 27 | 6.6 |
| **Level of Education** | | |
| Illiterate | 84 | 20.6 |
| Primary education | 89 | 21.8 |
| Secondary education | 118 | 28.9 |
| Certificate and above | 117 | 28.7 |
| **Occupation** | | |
| Housewife | 92 | 22.5 |
| Farmer | 46 | 11.3 |
| Merchant | 94 | 23 |
| Governmental Employee | 40 | 9.8 |
| Daily Laborer | 36 | 8.8 |
| Student | 100 | 24.5 |
| **Residence** | | |
| Urban | 93 | 22.8 |
| Rural | 315 | 77.2 |
| **Monthly Income** | | |
| <1000 | 51 | 12.5 |
| 1001–2000 | 49 | 12 |
| >2001 | 308 | 75.5 |

https://doi.org/10.1371/journal.pone.0244808.t001
service at hospital level while 127(31%) respondents were received the service at the health centers.

Factors of post-abortion family planning utilization

In bivariable analysis, age of the women, educational status, marital status, residence, gravidity, parity, the desire of additional children, previous history of abortion, gestational age of current pregnancy, sex preference of health care provider, type of abortion management, communication skill, accompanied with a husband, type of health institution, level of the health institution, and PAFP counseling were found to be candidate variables at P-value < 0.2 for the multivariable analysis. On multivariate analysis, educational status, post-abortion family

| Variable | Type of abortion management | Frequency | Percent (%) |
|----------|-----------------------------|-----------|-------------|
| Medication | 181 | 44.3 |
| MVA | 67 | 16.4 |
| Both | 160 | 39.2 |

| Variable | Type of health institution | Frequency | Percent (%) |
|----------|-----------------------------|-----------|-------------|
| Public | 248 | 60.8 |
| Private | 160 | 39.2 |

| Variable | Want additional child | Frequency | Percent (%) |
|----------|-----------------------|-----------|-------------|
| Yes | 338 | 82.8 |
| No | 70 | 17.2 |

| Variable | Planned Pregnancy | Frequency | Percent (%) |
|----------|-------------------|-----------|-------------|
| Yes | 222 | 54.4 |
| No | 186 | 45.6 |

| Variable | Know about PAFP method | Frequency | Percent (%) |
|----------|------------------------|-----------|-------------|
| Yes | 172 | 42.2 |
| No | 236 | 57.8 |

| Variable | Source of information | Frequency | Percent (%) |
|----------|-----------------------|-----------|-------------|
| Neighbor | 108 | 26.5 |
| Husband | 14 | 3.4 |
| Provider | 159 | 39 |
| Mass media | 24 | 5.9 |

| Variable | Post-abortion counseling | Frequency | Percent (%) |
|----------|--------------------------|-----------|-------------|
| Yes | 283 | 69.4 |
| No | 125 | 30.6 |

| Variable | Counseling type | Frequency | Percent (%) |
|----------|-----------------|-----------|-------------|
| Individual | 132 | 46.6 |
| With husband | 111 | 39.2 |
| With parents | 40 | 14.1 |

| Variable | Knowledge about PAFP | Frequency | Percent (%) |
|----------|-----------------------|-----------|-------------|
| Knowledgeable | 180 | 44 |
| Not Knowledgeable | 228 | 56 |

| Variable | Sex preference of the health care provider | Frequency | Percent (%) |
|----------|-------------------------------------------|-----------|-------------|
| Male | 162 | 39.7 |
| Female | 176 | 43.1 |
| Both | 70 | 17.2 |

Table 2. Reproductive health related characteristics of respondents in Bahir Dar town, Amhara Region, northwest Ethiopia, 2019.

https://doi.org/10.1371/journal.pone.0244808.t002
planning counseling, and type of abortion management were factors that affect post-abortion family planning utilization at p-value less than 0.05.

The odds of post-abortion family planning utilization among women who attended secondary educational level were 4.58 times higher than those who did not attend formal education [AOR = 4.58 (95%CI:1.69,10.69)]. The odds of post-abortion family planning utilization among women who attended a certificate and above educational level were 3.06 times higher than those who did not attend formal education [AOR = 3.06 (95%CI:1.32,7.08)]. The odds of post-abortion family planning utilization among women who received post abortion family planning counseling were 5.99 times higher than those who did not received [AOR = 5.99(95%CI:3.20,11.18)].

The odds of post-abortion family planning utilization among women whose abortion procedure managed by both MVA and medication were 4.62 times higher than those who managed by medication alone [AOR = 4.62 (95%CI: 2.18, 9.81)] (Table 3).

### Table 3. Factors associated with post abortion modern contraceptive utilization among women who came for abortion service in Bahir Dar city health institutions, North West Ethiopia, 2019.

| Variable                        | PAFP utilization | COR (95%CI) | AOR (95% CI) |
|---------------------------------|------------------|-------------|--------------|
| Educational status of the mother |                  |             |              |
| Not attained formal education   | 30               | 54          | 1            | 1            |
| Primary education               | 39               | 50          | 1.40(0.76,2.58) | 0.95(0.40,2.25) |
| Secondary education             | 86               | 32          | 4.83(2.64,8.84) | 4.58(1.69,10.69) |
| Tertiary education              | 91               | 26          | 6.30(3.77,11.75) | 3.06(1.32,7.08) |
| Receive PAFP Counseling         |                  |             |              |
| Yes                             | 170              | 46          | 5.64(3.65,8.72) | 5.99(3.20,11.18) |
| No                              | 76               | 116         | 1            | 1            |
| Abortion Management             |                  |             |              |
| Procedure                       |                  |             |              |
| Medication                      | 69               | 112         | 1            | 1            |
| MVA                             | 53               | 14          | 6.14(3.17,11.00) | 4.76(1.93,11.76) |
| Both                            | 124              | 36          | 5.59(3.47,9.01) | 4.62(2.18,9.81) |
| Number of pregnancies           |                  |             |              |
| One                             | 85               | 100         | 1            | 1            |
| Two                             | 68               | 28          | 2.85(1.68,4.83) | 2.22(0.99,4.97) |
| Three                           | 46               | 12          | 4.51(2.24,9.06) | 2.94(0.82,7.74) |
| Four                            | 47               | 22          | 2.51(1.40,4.50) | 0.76(0.29,2.00) |
| Type of institution             |                  |             |              |
| Public                          | 167              | 81          | 2.11(1.40,3.18) | 1.64(0.89,3.00) |
| Private                         | 79               | 81          | 1            | 1            |
| Number of children              |                  |             |              |
| No child                        | 99               | 103         | 1            | 1            |
| One                             | 69               | 29          | 2.47(1.48,4.14) | 0.15(0.01,1.59) |
| Two                             | 37               | 12          | 3.20(1.58,6.50) | 0.65(0.09,4.56) |
| Three and above                 | 41               | 18          | 2.37(1.27,4.40) | 6.90(0.27,17.27) |
| Previous abortion               |                  |             |              |
| Yes                             | 37               | 9           | 3.02(1.41,6.45) | 3.54(0.90,13.90) |
| No                              | 208              | 154         | 1            | 1            |

https://doi.org/10.1371/journal.pone.0244808.t003
Discussion

In this study, the overall post-abortion family planning utilization was 61% with 95% (CI: 55.0, 65.0). The finding of this study was consistent with previous studies conducted in Guragie district and Debire Markos Town, with overall post-abortion family planning utilization of 56.5% [28] and 59.2% [25] respectively. However, the finding of this study was lower than the previous studies conducted in Addis Ababa [26], Ethiopia [14] and Brazil [29]. This variation may be due to marital status differences. The percentage of married women was higher in the study from Brazil (86.7%) compared to our finding in which 58.8% of the respondents were married. Presence of more married women may increase the utilization of PAFP since they are more autonomous to decide family planning use [26]. The other reason may be due to educational level differences. A study conducted in Addis Ababa showed that, 75% of respondents attended secondary and above educational levels [25] but the current study showed only 57.6% of respondents were secondary and above educational levels accomplishes. In Brazil, 92.6% of respondents were knowledgeable which may increase the utilization of post-abortion modern contraceptive [30]. In addition, the finding of this study was higher compared to the previous study done in Dessie Town (47.5%). This difference might be due to the difference in the number of respondents who counseled about post abortion family planning. A study conducted in Dessie Town showed only 56% of respondents received post-abortion family planning counseling [31] while in the current study, 69% of the respondents received post-abortion family planning counseling [15].

The odds of post-abortion family planning use among women who attended secondary education and above was higher compared to women who did not attend formal education. The finding of this study was similar to the previous studies conducted in Debre Markose Town [32], Gambella [33], and Kenya [34]. This might be due to the reason that educated women have better access to information about family planning and reproductive health issues [35] which enables them to pass informed decisions and more concerned about their reproductive health rights [14]. This implies that extending women’s education to at least secondary level increases the uptakes of PAFP contributing to achieving SDG 3.1 to end all preventable causes of maternal death.

The odds of post-abortion family planning use among women who received post-abortion family planning counseling was higher than the counterparts. The finding of this study was similar with the previous studies conducted in Debre Markos [36], Kenya [37] and Brazil [38]. This might be due to counseling helps the women to make informed decisions about family planning services utilization [39]. Counseling is one of the critical elements in the provision of quality family planning services. It is a means, provider help clients make and carry out their own choices about reproductive health and family planning [40]. Post-abortion contraceptive counseling is an effective way of increasing the utilization of highly effective methods of contraception [41].

The odds of post-abortion family planning utilization among women whose abortion procedure managed by MVA was higher compared to women managed by medication alone. This finding was in line with the previous studies conducted in England and Wales [42] and Pakistan [43]. However, the finding of this study was different from the study conducted in India [44]. This discrepancy might be due to variation in women preference to nature of procedure, which takes a shorter time [45]. Similarly, the odds of post-abortion family planning use among women managed with both (manual vacuum aspiration and medication) were higher compared to women managed with medication. This finding was supported by the study conducted in eight countries of Africa [46].
Conclusions

The magnitude of post-abortion family planning utilization in Bahir Dar city health facilities was low compared to the national figure. Attending education, type of abortion management and receiving counseling were predictors of post-abortion family planning method utilization. Based on the findings, we recommend that making more efforts on counseling service provision by Ministry of Health (MoH) is the effective and sustainable method in increasing PAFP utilization of women.

Supporting information

S1 File. Data set, that contain the survey data of the participant.
(XLSX)

Acknowledgments

First of all, the authors would like thanks to all participants who were volunteer to participate in this study. We are also grateful to the Bahir Dar town health office staff, health professionals for their invaluable support through the whole process and the supervisors and data collectors who have committed themselves throughout the study period.

Declaration: Consent for publication. Verbal consent for publication was received from the participant with regard to all the detail that explains the participants.

Author Contributions

Conceptualization: Amsalu Muchie, Fentie Ambaw Getahun, Yibeltal Alemu Bekele.
Data curation: Amsalu Muchie, Fentie Ambaw Getahun, Yibeltal Alemu Bekele.
Formal analysis: Amsalu Muchie, Fentie Ambaw Getahun, Yibeltal Alemu Bekele.
Investigation: Amsalu Muchie, Fentie Ambaw Getahun, Yibeltal Alemu Bekele.
Methodology: Amsalu Muchie, Fentie Ambaw Getahun, Yibeltal Alemu Bekele.
Software: Amsalu Muchie, Fentie Ambaw Getahun, Yibeltal Alemu Bekele.
Supervision: Amsalu Muchie, Fentie Ambaw Getahun, Yibeltal Alemu Bekele.
Validation: Amsalu Muchie, Fentie Ambaw Getahun, Yibeltal Alemu Bekele.
Writing – original draft: Amsalu Muchie, Fentie Ambaw Getahun, Yibeltal Alemu Bekele.
Writing – review & editing: Amsalu Muchie, Fentie Ambaw Getahun, Yibeltal Alemu Bekele, Tsion Samual, Tebkew Shibabaw.

References

1. World Health Organization (WHO). Trends in maternal mortality: 1990–2015: estimates from WHO, UNICEF, UNFPA, World Bank Group, and the United Nations Population Division: executive summary. 2015.
2. World Health Organization (WHO). Global health observation data 2015.
3. World Health Organization (WHO). Provision of effective antenatal care: integrated management of pregnancy and childbirth (IMM/AC). Geneva: Standards for maternal and neonatal care (16), Department of making pregnancy safer. 2006.
4. UNICEF. Global Antenatal care coverage 2016.
5. Kuruvilla S, Bustreo F, Kuo T, Mishra C, Taylor K, Fogstad H, et al. The Global strategy for women’s, children’s and adolescents’ health (2016–2030): a roadmap based on evidence and country experience.
6. World Health Organization (WHO). New ANC recommendation for positive pregnancy experience 2016.
7. World Health Organization (WHO). Antenatal care randomization trial Geneva 2002.
8. USAID. FANC planning and providing care during pregnancy Maternal and Child Health Journal. 2004 (JHPIEGO/MNH Program USA).
9. Wang W, Alva S, Wang S, Fort A. Levels and trends in the use of maternal health services in developing countries. 2011.
10. Uganda Bureau of Statistics. Uganda Demographic and Health Survey 2016 Key Indicators Report. 2017.
11. National Institute of Statistics of Rwanda. Rwanda Demographic and Health Survey 2014–15 Final Report. 2016.
12. Ethiopian Central Statistics Agency (ECSA). Ethiopian demographic health survey (EDHS). 2016.
13. Adhikari T, Sahu D, Nair S, Saha KB, Sharma RK, Pandey A. Factors associated with utilization of antenatal care services among tribal women: A study of selected States. The Indian journal of medical research. 2016;144. https://doi.org/10.4103/0971-5916.193284 PMID: 27834327
14. Rurangirwa AA, Mogren I, Nyirazinyoye L, Ntaganira J, Krantz G. Determinants of poor utilization of antenatal care services among recently delivered women in Rwanda; a population based study. BMC pregnancy and childbirth. 2017; 17(1):142. https://doi.org/10.1186/s12884-017-1328-2 PMID: 28506265
15. Mugo NS, Dibley MJ, Agho KE. Prevalence and risk factors for non-use of antenatal care visits: analysis of the 2010 South Sudan household survey. BMC pregnancy and childbirth. 2015; 15(1):68. https://doi.org/10.1186/s12884-015-0491-6 PMID: 25885187
16. Pandey S, Kariki S. Socio-economic and Demographic Determinants of Antenatal Care Services Utilization in Central Nepal. International Journal of MCH and AIDS. 2014; 2(2):212. PMID: 27621975
17. Pell C, Merfaca A, Were F, Afrah NA, Chatio S, Manda-Taylor L, et al. Factors affecting antenatal care attendance: results from qualitative studies in Ghana, Kenya and Malawi. PLoS one. 2013; 8(1):747. https://doi.org/10.1371/journal.pone.0053747 PMID: 23335973
18. Gebremeskel F, Dibaba Y, Admassu B. Timing of first antenatal care attendance and associated factors among pregnant women in Arba Minch town and Arba Minch district, Gamo Gofa zone, South Ethiopia. Journal of environmental and public health. 2015;2015. https://doi.org/10.1155/2015/971506 PMID: 26653485
19. Molla Gedefaw, Bilal Muche, Mekonen Aychiluhem. Current Status of Antenatal Care Utilization in the Context of Data Conflict: The Case of Dembecha District, Northwest Ethiopia. Open Journal of Epidemiology. 2014; 4(04):208.
20. Kindie Muchie, Fentahun. Quality of antenatal care services and completion of four or more antenatal care visits in Ethiopia: a finding based on a demographic and health survey. BMC pregnancy and childbirth. 2017; 17(1):300. https://doi.org/10.1186/s12884-017-1488-0 PMID: 28893222
21. The Federal Democratic Republic of Ethiopia Ministry of Health (FDRE-MOH). Health Sector Transformation Plan (HSTP) 2015/16–2019/20. 2015.
22. Bahir Dar Zuria district. Quarterly and Yearly report 2017.
23. Singh DR, Jha T. Exploring Factors Influencing Antenatal Care Visit Dropout at Government Health Facilities of Dhanusha District, Nepal. American Journal of Public Health Research. 2016; 4(5):170–5.
24. Gupta S, Yamada G, Mpembeni R, Frumence G, Callaghan-Koru JA, Stevenson R, et al. Factors associated with four or more antenatal care visits and its decline among pregnant women in Tanzania between 1999 and 2010. PloS one. 2014; 9(7):e101893. https://doi.org/10.1371/journal.pone.0101893 PMID: 25036291
25. Adewuyi EO, Auta A, Khanal V, Bamidele OD, Akuoko CP, Adefemi K, et al. Prevalence and factors associated with underutilization of antenatal care services in Nigeria: A comparative study of rural and urban residences based on the 2013 Nigeria demographic and health survey. PloS one. 2018; 13(5): e0197324. https://doi.org/10.1371/journal.pone.0197324 PMID: 29782511
26. Ali S, Dero A, Ali S. Factors affecting the utilization of antenatal care among pregnant women: A literature review. J Preg Neonatal Med 2018; 2 (2): 41–45.
27. Tilaye Gudina Terfasa, Mesganaw Fantahun Afework, Frew Tadesse Berhe. Antenatal Care Utilization and It’s Associated Factors in East Wollega Zone, Ethiopia. Preg Child Health 2017; 4 https://doi.org/10.4172/2376-127X.1000316:2.
28. Gitonga E. Determinants of focused antenatal care uptake among women in tharaka nithi county, Kenya. Advances in Public Health. 2017; 2017.
29. Edgard-Marius O, Charles SJ, Jacques S, Justine GC-C, Virginie MA, Ibrahim MA, et al. Determinants of Low Antenatal Care Services Utilization during the First Trimester of Pregnancy in Southern Benin Rural Setting. Universal Journal of Public Health. 2015; 3(5):220–8.

30. Audet CM, Blevins M, Chire YM, Aliyu MH, Vaz LM, Antonio E, et al. Engagement of men in antenatal care services: increased HIV testing and treatment uptake in a community participatory action program in Mozambique. AIDS and behavior. 2016; 20(9):2090–100. https://doi.org/10.1007/s10461-016-1341-x PMID: 26906021

31. Abosse Z, Woldie M, Oolo S. Factors influencing antenatal care service utilization in hadiya zone. Ethiopian Journal of Health Sciences. 2010; 20(2). https://doi.org/10.4314/ejhs.v20i2.69432 PMID: 22434964

32. Khanal Vishnu, da Cruz, Jonia Lourenca, Nunes Brites, Mishra Shiva Raj, Karkee Rajendra, et al. Under-utilization of antenatal care services in Timor-Leste: results from Demographic and Health Survey 2009–2010. BMC pregnancy and childbirth. 2015; 15(1):211. https://doi.org/10.1186/s12884-015-0646-5 PMID: 26350207

33. Timor-Leste Ministry of Health. The national health sector strategic plan for 2011–2030 Timor-Leste. 2011.

34. Makenzius M, Faxelid E, Gemzell-Danielsson K, Odero TM, Klingberg-Allvin M, Oguttu M. Contraceptive uptake in post abortion care—Secondary outcomes from a randomised controlled trial, Kisumu, Kenya. PloS one. 2018; 13(8):e0201214. https://doi.org/10.1371/journal.pone.0201214 PMID: 30096148

35. Bbaale E, Mpuga P. Female education, contraceptive use, and fertility: evidence from Uganda. Consilience. 2011(6):20–47.

36. Kokeb L, Admassu E, Kassa H, Seyoum T. Utilization of Post Abortion Contraceptive and Associated Factors among Women who Came for Abortion Service: a Hospital Based Cross Sectional Study. J Fam Med Dis Prev. 2015; 1:022.

37. Mutua MM, Achiwa TN, Maina BW, Izugbara CO. A cross-sectional analysis of Kenyan postabortion care services using a nationally representative sample. International Journal of Gynecology & Obstetrics. 2017; 138(3):276–82. https://doi.org/10.1002/ijgo.12239 PMID: 28631406

38. Borges ALV, OlaOlorun F, Fujimori E, Hoga LAK, Tsui AO. Contraceptive use following spontaneous and induced abortion and its association with family planning services in primary health care: results from a Brazilian longitudinal study. Reproductive health. 2015; 12(1):94. https://doi.org/10.1186/s12978-015-0067-7 PMID: 26470703

39. The ACQUIRE Project. Counseling for effective use of family planning participant handbook New York: EngenderHealth/The ACQUIRE Project. 2008.

40. Abamecha A, Shiferaw A, Kassaye A. Assessment of Post Abortion Contraceptive Intention and Associated Factors among Abortion Clients In Gambella Health Facilities, Gambella Town, South West Ethiopia.

41. Weisman CS, Maccannon DS, Henderson JT, Shortridge E, Orso CL. Contraceptive counseling in managed care: preventing unintended pregnancy in adults. Women's Health Issues. 2002; 12(2):79–95. https://doi.org/10.1016/s1049-3867(01)00147-5 PMID: 11879761

42. Bury L, Hoggart L, Newton VL. “I thought I was protected” Abortion, contraceptive uptake and use among young women: a quantitative survey. 2014.

43. SatharZA, Singh S, Fikree FF. Estimating the incidence of abortion in Pakistan. Studies in family planning. 2007; 38(1):11–22. https://doi.org/10.1111/j.1728-4465.2007.00112.x PMID: 17385379

44. Dhillon B, Chandhiok N, Kambo I, Saxena N. Induced abortion and concurrent adoption of contraception in the rural areas of India (an ICMR task force study). 2004.

45. Azmat S, Waqas H, Muhammad I, Ghulam M, Aftab A. Post-abortion care family planning use in Pakistan. Pakistan Journal of Public Health. 2012; 2(2):4–9. https://doi.org/10.1017/S0021932012000296 PMID: 22652308

46. Benson J, Andersen K, Brahmi D, Healy J, Mark A, Ajode A, et al. What contraception do women use after abortion? An analysis of 319,385 cases from eight countries. Global public health. 2018; 13(1):35–50. https://doi.org/10.1080/17441692.2016.1174280 PMID: 27193827