

## Research Article

## Impact of COVID-19 Pandemic on Postpartum Contraceptives Method Choice (IUD vs Tubectomy) and Characteristic Aspects: A Retrospective Descriptive Study

Asih Anggraeni, Grace Kalpika Taruli Siagian, Hafi Nurinasari, Syah Rini Wisdayanti, Sri Sulistyowati, Soetrisno

*Department of Obstetrics and Gynecology,  
Faculty of Medicine Sebelas Maret University  
Sebelas Maret University Hospital  
Surakarta*

### Abstract

**Objective:** This study aims to assess the impact of the COVID-19 pandemic on postpartum contraceptive methods.

**Methods:** This retrospective descriptive study was conducted at a single secondary center, utilizing secondary data retrieved from medical records at the Inpatient Installation of Sebelas Maret University Hospital, Surakarta, covering the period from January 2020 to January 2022.

**Results:** Among users of intra-uterine devices (IUDs), 85% were below 35 years old, 65% were primiparous, 67% had a history of previous injectable contraceptive use, 79% received routine antenatal care, and 51% had education below a college level. These individuals were educated about the importance of contraceptive programs during the COVID-19 pandemic. Sixty-six percent of IUD insertions were conducted via vaginal delivery, and 27% had health facilities within less than 1 km. In contrast, tubectomy contraceptive users comprised 106 patients, with the majority (54%) being aged 35 years or older, all being multiparous, and 25% tested positive for COVID-19. Among tubectomy users, 43% had a history of previous injectable contraceptive use, 85% received routine antenatal care, and 54% had education below a college level. Similar to the IUD group, they were educated about the significance of contraceptive programs during the COVID-19 pandemic. Eighty-four percent of tubectomies were performed via cesarean section, and 27% of patients lived within less than 1 km from health facilities.

**Conclusion:** The usage rates of intra-uterine devices and tubectomy for contraceptives remained stable during the COVID-19 pandemic. However, there was a decrease in postpartum in-person visits and mobility, coupled with an increase in hospitalizations. **Keywords:** contraceptive; family planning; intrauterine device; tubectomy.

**Correspondence author.** Asih Anggraeni. Department of Obstetrics and Gynecology.  
Faculty of Medicine Universitas Sebelas Maret / Sebelas Maret University Hospital Surakarta.  
Email: dr.asihspog@gmail.com

Received: May, 2023    Accepted: October, 2023    Published: January, 2024

### INTRODUCTION

An outbreak of pneumonia of unknown origin was detected in China in December 2019, caused by a new coronavirus identified as "severe acute respiratory syndrome coronavirus 2" (SARS-CoV-2).<sup>1</sup> The World Health Organization (WHO) Emergency Committee declared the corona virus disease (COVID-19) a global health emergency on January 30th, 2020. As per 14th October 2022, the COVID-19 has infected 620,878,405 people, globally.<sup>2</sup> In Indonesia, there were 6,453,864 people infected by COVID-19, with the active cases counted 17,470 (0.3%) daily, the cure rate

just reached 6,278,113 people, and death rate for COVID-19 was 158,281 people.<sup>3</sup> The clinical signs and symptoms of COVID-19 in most cases were fever, and some cases have dyspneu.<sup>4</sup>

The COVID-19 pandemic has the potential to significantly disrupt the achievement of family planning programs by 2030. Lockdown measures imposed on communities and the risk of infection among healthcare workers make it imperative to anticipate barriers to reproductive health services during the COVID-19 pandemic.<sup>5</sup> These barriers include a combination of disruptions in the contraceptive supply chain (e.g., barriers to contraceptive production and distribution),

shifts in the focus of the healthcare system (e.g., suspension of certain services and shifting of resources to pandemic response), and reduced demand for sexual and reproductive health services due to reluctance to visit health facilities and mobility restrictions.<sup>6,7</sup>

The rate of unwanted pregnancy in Indonesia reached 40 per 1,000 women of reproductive age with 63% of them terminating the pregnancy by obtaining an abortion. The National Population and Family Planning Agency (BKKBN) reported a 4% reduction in contraceptive use from February 2020 to March 2020 in Indonesia.<sup>8</sup> Increased fertility and sexual activity in the postpartum phase combined with increased difficulty in accessing services in the postpartum period pose certain risks for unwanted pregnancies.<sup>2</sup>

This study purposed to report the impact of the COVID-19 era on postpartum contraceptive method.

## METHODS

This study is a retrospective conducted at the inpatient setting of the Sebelas Maret University Hospital from January 2020 to January 2022.

The total sampling technique used for this study contained post partum patients hospitalized in Sebelas Maret University Hospital between January 2020 to January 2022, based on the inclusion and exclusion criteria. This research has gone through a review for the existence of a certificate of ethical feasibility by the ethics committee of the Sebelas Maret University Hospital. Inclusion criteria included all postpartum women at the Inpatient Installation of Sebelas Maret University Hospital who were treated and documented using a postpartum IUDs or tubectomy at the Inpatient Installation of Sebelas Maret University Hospital. The exclusion criteria were patients with incomplete medical record data. Characteristics of the patients included age, parity, education grade, history of antenatal care, history of contraceptive use, mode of delivery, distance accessibility to health facilities, and reasons for contraceptive decisions. Identification of postpartum contraceptives used contraceptive procedures, diagnosis, and dispensing codes.

The independent variables were pregnant women who gave birth and were treated at the Inpatient Installation of Sebelas Maret University Hospital in the period January 2020 to January 2022. The dependent variable was patients

with postpartum contraceptive choices, either tubectomy or IUD users. This research only focuses on comparing the IUDs and tubectomy contraceptive methods for several reasons; tubectomy and IUDs are contraceptive methods with high efficacy and low side effects,<sup>9,10</sup> during the COVID-19 pandemic, regulations of social distancing with less outdoor activities have had an impact on reducing the number of patients who come to the hospital compared to the nearest health facility; therefore the COVID-19 condition has a more significant impact on the use of IUDs and tubectomies which require more advanced health facilities, compared to other contraceptive methods, such as birth control pills, implants or injections,<sup>11,12</sup> and the chosen contraceptive methods were adjusted to the research location, as this research was a hospital-based study, the patients who admit specifically for other simple contraceptive method (birth control pills, implants, or injections) were lacking and could not be used as representative data of their population users.

The data regarding the characteristics of tubectomy or IUD users during the COVID-19 Pandemic at Sebelas Maret University Hospital was descriptively presented as a frequency distribution table using Microsoft Excel and then analyzed utilizing Statistical and Product Service Solution (SPSS) 25.0 for Windows. Before carrying out the research, the researcher had obtained ethical clearance from the Health Research Ethics Committee Dr. Moewardi, with number 141 / I / HREC / 2023 as a guarantee that this research has been reviewed for its appropriateness by applicable medical ethics.

## RESULTS

This study is based on data from January 2020 – January 2022 with a total of 395 post-partum patients which consist of 106 patients (26%) included as tubectomy contraceptive users, 233 patients (60%) as IUD users, 11 patients (3%) with other contraceptives (interrupted coitus, barrier, hormonal contraceptive), and 45 patients (11%) without any contraceptive at Sebelas Maret University Hospital.

A comparison of demographic data on IUD and tubectomy contraceptive users is presented in Table 1. Based on age, 85% (198 subjects) of IUD users are women with a younger age (< 35 years) compared to tubectomy contraceptive users, where 54% (57 subjects) of the users are

women  $\geq 35$  years. Regarding parity, both IUD and tubectomy contraceptive users are dominated by multiparous patients, although the percentages are quite far, 65% (152 subjects) and 100% (106 subjects), respectively. This similarity was also found in the history of antenatal care (ANC), where both groups have a population that regularly undergoes ANC and have been given education regarding the urgency of contraceptive usage, especially during COVID-19, with a slightly higher in tubectomy users, 85% (90 subjects) compared to IUD users, 79% (183 subjects). Regarding the mode of delivery, we found that the two groups have very different user characteristics, where 66% (153 subjects) of IUD users are women with a history of spontaneous delivery. In contrast, 84% (89 subjects) of tubectomy contraceptive users are women with history of C-sections.

Other predisposing factors, such as education level, were also analyzed. From the education level, we found that there was no significant difference between users of the two contraceptive methods, where the ratio between patients with high school or below : higher educational level was around 1 : 1 (51%:49% for IUD users and 54 %:46% in tubectomy contraceptive users). Interestingly, based on the history of contraceptive use data, 67% (153 subjects) of IUD users were previously a user of birth control injections. In comparison, only 43% (46 subjects) of tubectomy users previously used birth control injections as their contraceptive method. More importantly, the data shows that 40% (42 subjects) of tubectomy users were previously IUD users, while among IUD users, 20% (49 subjects) chose not to use any contraceptive method before finally deciding to choose an IUD.

In accordance with the focus of this research, which evaluates the effects of COVID-19, we also evaluated the access to primary health facilities. We found that in both groups, 27% of the users could access primary health facilities within a distance of <1 km. The method of tubectomy was also evaluated and revealed that Pomeroy was the most commonly used method, which was performed in 100 subjects (94%) of tubectomy contraceptive users, followed by Kroener, Uchida, and Madlener (2 subjects each).

**Table 1.** Demographic Data of IUDs and Tubectomy Contraceptive Users

Variables	Frequency n (%)	
	IUDs	Tubectomy
<b>Age (y.o.)</b>		
< 35	198 (85)	49 (46)
$\geq 35$	35 (15)	57 (54)
<b>COVID-19 Infection</b>		
Positive	50 (21)	26 (25)
Negative	183 (79)	80 (75)
<b>Parity</b>		
Primipara	81 (35)	0 (0)
Multipara	152 (65)	106 (100)
<b>Mode of delivery</b>		
Spontaneous	153 (66)	17 (16)
C-Section	80 (34)	89 (84)
<b>History of antenatal care</b>		
Routinely	183 (79)	90 (85)
Not routinely	50 (21)	16 (15)
<b>Educational level</b>		
High school or below	118 (51)	57 (54)
Higher educational level	115 (49)	49 (46)
<b>History of contraceptive</b>		
Pill	29 (12)	10 (9)
Injection	153 (67)	46 (43)
Implant	0 (0)	2 (2)
Intra-uterine devices (IUD)	0 (0)	42 (40)
Others (barrier, coitus interruptus)	2 (1)	2 (2)
None	49 (20)	4 (4)
<b>Access to primary health facilities (km)</b>		
< 1	62 (27)	29 (27)
> 1	171 (73)	77 (73)
<b>Method of tubectomy</b>		
Pomeroy		100 (94)
Kroener		2 (8)
Uchida		2 (8)
Irving		0 (0)
Madlener		2 (8)
Aldridge		0 (0)

## DISCUSSION

The COVID-19 widespread postures boundaries to get a postnatal sterilization procedure, counting at the patient and health care provider levels to the policy level. Research by Medicaid reports that at slightest half of the women who desire postnatal sterilization actually undergo the procedure while more than 20% who do not get the desired postpartum sterilization will experience another unwanted pregnancy within that time period in the following year.<sup>2,12</sup> Previous studies reported that healthcare resources are used for personal protective for COVID-19 infections, and the focus on sexual and reproductive health services is hampered which is also affected. Delays in seeking, accessing, and

receiving contraceptives during a pandemic thus increase the risk of maternal death, secondary morbidity due to unwanted pregnancies, and an increased financial burden to deal with these complications by an already strained health care system.<sup>5</sup> The impact of COVID-19 on sexual and reproductive health (SRH) should not be ignored and must be acknowledged as thoroughly as its clinical scope.

Data released by BKKBN in the National Family Planning Program Report regarding the accumulated results of new family planning services for national health insurance participants according to contraceptive methods in 2020 shows that overall, there was a decrease by 4% from February 2020 to March 2020. More detail, the highest decrease occurred in vasectomies (76%), implant removal (16%), IUDs (9%), and condoms (9%). This data also shows that only injectable contraceptives did not experience a decrease. At the same time, other contraceptive methods, such as tubectomy and pills, were also affected, with a decrease of 6% and 4%, respectively.<sup>13</sup> Based on our result, we reported that 60% (233 subjects) of postpartum patients decided to use a IUD contraceptive usage while 26% (106 subjects) decided to chose tubectomy contraceptive usage. As many as 16% of women had given spontaneous delivery chose tubectomy as a postpartum contraceptive whereas 100% of the users were multiparous. In IUD users, 66% of them (153 subjects) had given spontaneous delivery which 35% (81 subjects) of them were a primiparous woman. The average number of patients with postpartum tubectomy contraceptives usage was  $\geq 35$  years with 57 patients (54%). The present findings contrast with certain prior research outcomes. One study reported a contraceptive usage rate of 83.04% among 3876 women aged 20–24 years, surpassing that of older age groups.<sup>14</sup> In a retrospective cohort study involving 23,965 patients who underwent laparoscopic tubal ligation, the median age for tubectomy was reported as 32.8 years.<sup>15</sup> However, the median age at tubal ligation was 35.5 years.<sup>16</sup> Our study aligns with the result of these studies indicating a prevailing inclination among older women to choose tubal ligation as their preferred contraceptive method. It's noteworthy that the increased availability and growing public acceptance of long-acting reversible contraceptives have led to a reduction in outpatient and interval sterilization procedures.

The World Health Organization (WHO)

recommends offering family planning counseling throughout the continuum of maternal health services, including antenatal care (ANC), childbirth, and the postpartum period, which encompasses postnatal care (PNC), child immunization, and well/sick baby clinics. Integrating family planning counseling within these maternal health services enables women to receive comprehensive care without the need for separate visits specifically for family planning services. Moreover, WHO recommends providing family planning education and services to women before their discharge from health facilities following childbirth. This strategy aims to increase women's awareness of the benefits of spacing pregnancies and to improve their knowledge and attitude towards modern contraceptive methods.<sup>17</sup> Many studies have evaluated the effect of family planning counseling during ANC on postpartum modern contraceptive uptake and reported a positive association.<sup>18–20</sup> For example, a study in Northern West Ethiopia indicated that family planning counseling during ANC increased modern contraceptive uptake by six weeks postpartum.<sup>21</sup> Similarly, a study in Nepal indicated that family planning counseling during ANC had improved postpartum contraceptive uptake.<sup>22</sup>

The provision of family planning counseling during ANC services exhibited a notable impact on encouraging the utilization of modern family planning methods in the postpartum period. Consequently, healthcare providers should prioritize the maintenance of seamless care by strengthening the amalgamation of family planning counseling services within ANC and establishing robust referral connections between community resources and healthcare workers.<sup>21</sup> Moreover, during a pandemic scenario, it appears prudent to prioritize the ANC program. Research findings indicate that women with a multiparous status exhibited a higher propensity for contraceptive utilization. Specifically, women identified as multiparous ( $\geq 3$ ) showcased a 25.58-fold greater likelihood of utilizing contraceptives.<sup>23</sup> The United States Centers for Disease Control and Prevention conducted a multicenter study known as the Collaborative Review of Sterilization (CREST), which prospectively enrolled over 10,000 women between 1978 and 1986, with a planned five-year follow-up. The study's findings revealed that regret associated with sterilization was lower in nulliparous women compared to women with at least one child. Consequently, a woman without children who wishes to remain child-

free is less likely to experience regret following sterilization compared to a mother who does not desire additional children.<sup>10</sup>

Studies in Mexico reported that 29% postpartum C-section patients used sterilization.<sup>23</sup> This present study showed 89 patients (84%) who underwent tubal ligation through C-sections had a higher risk of regret. There was however no incidence of regret reported during our study period due to the design of the study. This study also highlighted that 90 patients (85%) routinely attended antenatal care activities. This is in accordance which reported the frequency of antenatal care as measured by 75% of prescribed care was altogether related to any postpartum contraceptive.<sup>23</sup> In addition, access to contraceptives can also be extended to trained midwives or public health nurses to provide these services to patients. Health facilities can be strengthened by using digital medical devices to reach women's homes and encourage them to use contraceptives without having to visit the crowded health facilities.<sup>24</sup>

This study included 57 patients (54%) who had a history of lower level of education and 115 patients (49%) who had a history of higher levels of education. This result contrasts with a study that describe women who had completed higher education had 2.8 times greater odds of using contraceptives (AOR=2.800; 95% CI=2.181–3.594) than those who had not completed any formal education.<sup>25</sup> Groups of people who have a higher education have better access to family planning services and have a better position in the decision-making process regarding contraceptive use. This is also supported who state that the level of education of women influences the use of modern contraceptives. Groups of people who have a higher education have better access to family planning services and have a better position in the decision-making process regarding contraceptive use.<sup>19</sup> Therefore, it is suggested that health promotion toward contraceptives should be encouraged for those with low education.

Geographical location and the accessibility of health facilities significantly impact contraceptive utilization. In this study, 171 individuals (73%) had to travel more than 1 km to access a health facility. These findings contrast with a cross-sectional study conducted by Roy et al in 2021, which revealed that women residing in rural areas were approximately 65% less likely to use family planning methods compared to their

urban counterparts.<sup>5</sup> It is widely accepted that urban regions exhibit higher rates of family planning utilization compared to rural areas. This disparity is attributed to differences in financial circumstances, visits by family planning officers, levels of women's autonomy, and various community characteristics.

Ensuring the availability of effective contraceptives is considered a crucial priority in addressing this issue.<sup>26</sup> Overcoming barriers created by the pandemic to contraceptive services is crucial. Contraception plays a pivotal role in healthcare by empowering reproductive autonomy and reducing unwanted pregnancies.<sup>7</sup> The absence of clear recommendations for postponing pregnancy during the COVID-19 pandemic necessitates individualized decision-making. Hence, it is imperative to provide comprehensive education regarding the importance of contraceptives during both antenatal and postpartum care.<sup>24,26</sup> This study observed the successful performance of postpartum tubectomy procedures at Sebelas Maret University Hospital. The effectiveness of these procedures may be influenced by various factors such as the individual's educational background, utilization of antenatal care, and history of contraceptive use.

In this study, a majority of users of intrauterine device (IUD) contraceptives were below 35 years old, constituting 85% (198 women). This aligns with prior research findings indicating a higher prevalence of contraceptive use among women aged 25-34 years, accounting for 51.2%.<sup>15</sup> Regarding parity, 152 individuals (65%) in this study were classified as multiparous. Studies have shown a higher prevalence of contraceptive utilization among women with multiparous status. Notably, women identified as multiparous ( $\geq 3$  children) exhibited a 25.58-fold higher tendency to use contraceptives. These findings highlight the significant impact of the number of living children and perceptions of an ideal family size on women's attitudes toward contraceptive use. Therefore, a policy perspective is needed to promote better family planning.

The majority of 153 patients (66%) who received IUDs in our study had a history of spontaneous vaginal delivery. This finding was similar to the result of recent retrospective study about prevalence of long-acting reversible contraceptive (LARC) methods utilization and associated factors which revealed that spontaneous vaginal delivery was the most common method of delivery in

IUD users.<sup>27</sup> However, in this study, C-section was only recommended for pregnant women who has obstetric indications and researchers maintain a focus on postpartum contraceptive as an important strategy to promote maternal and newborn health. Service providers need the knowledge and skills to provide reversible long-acting contraceptives (i.e. IUDs and implants) following vaginal and abdominal delivery. In this study, it was reported that 183 people (79%) routinely attended antenatal care activities. This is in accordance with a study conducted by Arero et al in 2022 which reported that receiving counseling during antenatal care were associated with immediate any postpartum reversible long acting contraceptive methods use.<sup>27</sup>

IUD insertion techniques had been standardized using the no-touch and withdrawal technique. The IUD used for postpartum women was so far using a regular IUD, which was inserted in two ways. The first way was by using two fingers (index and middle fingers) where the IUD is clamped between them and inserted into the uterine cavity through the dilated cervix until it was attached to the fundus. The second way was using ring forceps in which the IUD was held at the junction between the two vertical arms and horizontal bar, and it was inserted through the dilated cervical os and pushed deep into the uterine fundus.<sup>28</sup>

The Indonesian Journal of Obstetrics and Gynecology have been studied about the effectivity and safety between R-inserter group and IUD inserted by forceps ring in woman with IUD users. In the R-inserter group, the cumulative rate of expulsion was highest at three months follow up, i.e. 4,3%, and there was no additional expulsion thereafter. Those who suffered from pain and bleeding were treated with mefenamic acid and tranexamic acid, respectively.<sup>28</sup> Three subjects from the R-inserter group had their IUDs removed because of bleeding. Two cases from each group had their IUDs removed because of infection unresponsive to a standard antibiotic treatment. Continuation rates were 93.7%, 93.2% 90.8% and 90.8% each for three, six, nine and 12 months respectively. A multicenter study using CuT 380A IUD inserted by forceps ring during postpartum period reported expulsion rate 13.8%, 16.6% and 20.5% each for the first, third and sixth months follow up, respectively. Others showed cumulative expulsion rate 2.67% at three months follow up 7% at six months and 12.3%

at 12 months there after. The primary and attracting event in the postpartum IUD insertion was high expulsion rate. There was no difference between the R-inserter and ring forceps group, neither in the rate of expulsion nor infection.<sup>28</sup>

Ensuring effective contraceptive services remains an imperative and top priority, necessitating prompt resolution of delays in these services caused by the pandemic. The American College of Obstetricians and Gynecologists (ACOG) emphasizes the critical role of contraceptives in healthcare, aiming to enhance reproductive autonomy and mitigate unwanted pregnancies. The absence of clear guidelines recommending the postponement of pregnancy amid the COVID-19 pandemic underscores the necessity for individualized decision-making. Therefore, comprehensive education spanning from prenatal care to postpartum care regarding the imperative nature of contraceptives becomes essential.<sup>24,26</sup> This study highlights the consistent provision of postpartum Intrauterine Device (IUD) services at Sebelas Maret University Hospital. Factors such as educational level, history of antenatal care, and prior contraceptive usage are influential in determining the adoption of postpartum contraceptive methods.

Numerous studies have outlined the effects of the pandemic on contraceptive services. This particular study delves into the state of contraceptive services and outlines the profile of hospital-based contraceptive users among postpartum women amidst the COVID-19 pandemic. However, it is important to acknowledge certain limitations in this study, notably its retrospective and descriptive design, as well as being conducted in a single-center setting. These limitations might restrict the representation of the findings to the broader population.

This study scrutinized various determinants influencing the choice to use postpartum contraceptives, encompassing educational background, utilization of antenatal care, accessibility, and reasons underlying the refusal of contraceptives.

## CONCLUSION

The widespread impact of COVID-19 has affected women's access to contraceptive services, potentially exacerbating existing disparities in the quality of contraceptive care. This, in turn,

poses a threat to women's autonomy. In the short term, understanding how the COVID-19 pandemic affects encounters, utilization, and choices regarding contraceptive care can mitigate adverse effects on sexual and reproductive health. Our results underscore the importance of promoting family planning education among local community workers, particularly concerning pregnancies that are deemed high-risk. It is crucial to give equal attention to healthcare issues during the pandemic, including ensuring affordable family planning services despite social restrictions. This is because a high level of education and the quality of that education significantly influence comprehension and informed decision-making processes.

### ACKNOWLEDGMENT

The author would like to address a distinguished opportunity for the Obstetrics and Gynecology Medical Clinicians at Sebelas Maret University Hospital for their cooperation and support. This research received no grant from any funding agency in the public, commercial, or not-for-profit sectors.

### CONFLICT of INTEREST

The authors state that the research was conducted without any commercial or financial relationship that could be construed as a potential conflict of interest.

### REFERENCES

1. Ferreira-Filho ES, de Melo NR, Sorpreso ICE, Bahamondes L, Simões RDS, Soares-Júnior JM, et al. Contraception and reproductive planning during the COVID-19 pandemic. *Expert Review of Clinical Pharmacology*. Taylor and Francis Ltd. 2020;13:615–22.
2. Miller HE, Henkel A, Leonard SA. The impact of the COVID-19 pandemic on postpartum contraception planning. *Am J Obstet Gynecol MFM*. 2021;3 <https://www.fphandbook.org/>.
3. Widaryanti R, Riska H, Ratnaningsih E, Yuliani I. Pemasangan IUD dan Implant Sebagai Pencegahan Baby Boom Pada Masa Pandemi Covid-19. *Sasambo: Jurnal Abdimas (J Comm Serv)*. 2021 Jun 30;3(2):83–91.
4. Saimin J, Ridwan S, Salman S, Hermawan W. Clinical Profile of Pregnant Women with COVID-19 Hospitalized in Regional Referral Hospital. *Indones J Obstet Gynecol*. 2021;9(1):1–5.
5. Roy N, Amin MB, Maliha MJ, Sarker B, Aktarujjaman M, Hossain E, et al. Prevalence and factors associated with family planning during COVID-19 pandemic in Bangladesh: A cross-sectional study. *PLoS One*. 2021 Sep 1;16(9 September).
6. Dude A, Matulich M, Estevez S, Liu LY, Yee LM. Disparities in Postpartum Contraceptive Counseling and Provision among Mothers of Preterm Infants. *J Womens Health*. 2018 May 1;27(5):676–83.
7. Fikslin RA, Goldberg AJ, Gesselman AN, Reinka MA, Pervez O, Franklin ET, et al. Changes in Utilization of Birth Control and PrEP During COVID-19 in the USA: A Mixed-Method Analysis. *Arch Sex Behav*. 2022 Jan 1;51(1):365–81.
8. Dabash R, Billings DL, Saraswati PW. Saving more lives on time: Strategic policy implementation and financial inclusion for safe abortion in Indonesia during COVID-19 and beyond. *frontiersin.org*. 2022;3:1–7.
9. Britton LE, Alspaugh A, Greene MZ, McLemore MR. An Evidence-Based Update on Contraception. *AJN J*. 2013;120(2):22–34. Available from: [www.cdc.gov/mmwr/](http://www.cdc.gov/mmwr/)
10. Tasset J, Jensen JT. Efficacy of Tubal Surgery for Permanent Contraception: Considerations for the Clinician. *Open Access J Contracept*. 2023 Mar; 14:53–9.
11. Birkmeyer JD, Barnato A, Birkmeyer N, Bessler R, Skinner J. The impact of the COVID-19 pandemic on hospital admissions in the United States. *Health Aff*. 2020 Nov 1;39(11):2010–7.
12. Walker SH. Effect of the COVID-19 pandemic on contraceptive prescribing in general practice: a retrospective analysis of English prescribing data between 2019 and 2020. *Contracept Reprod Med*. 2022 Dec;7(1).
13. BKKBN. Laporan Faskes 2013 Tabel 6 Kumulatif | Statistik Rutin [Internet]. Laporan Program KB Nasional. 2021 <http://aplikasi.bkkbn.go.id/sr/Klinik/Laporan2013/Bulanan/Faskes2013Tabel6Kumulatif.aspx>
14. Mola FEP, Suza DE, Efendi F, Hadisuyatmana S, Astutik E, Susanti IA. Factors associated with the use of contraception among women age 15–24 years in Indonesia. *Systematic Reviews in Pharmacy*. 2020;11(5):234–40.
15. Schwarz EB, Lewis CA, Dove MS, Murphy E, Zuckerman D, Nunez-Eddy C, et al. Comparative Effectiveness and Safety of Intrauterine Contraception and Tubal Ligation. *J Gen Intern Med*. 2022 Dec 1;37(16):4168–75.
16. Lunani LL, Abaasa A, Omosa-Manyonyi G. Prevalence and Factors Associated with Contraceptive Use Among Kenyan Women Aged 15–49 Years. *AIDS Behav*. 2018 Jul 1;22:125–30.
17. Mruts KB, Tessema GA, Gebremedhin AT, Scott JA, Pereira G. The role of family planning counselling during maternal and child health services in postpartum modern contraceptive uptake in Ethiopia: A national longitudinal study. *PLOS Global Public Health*. 2022 Aug 3;2(8):e0000563.
18. Tilahun T, Bekuma TT, Getachew M, Oljira R, Seme A. Barriers and determinants of postpartum family planning uptake among postpartum women in Western Ethiopia: a facility-based cross-sectional study. *Arch Public Health*. 2022 Dec 1;80(1).
19. Abraha TH, Teferra AS, Gelagay AA. Postpartum modern contraceptive use in northern Ethiopia: prevalence and associated factors. *Epidemiol Health*. 2017;39:e2017012.
20. Achwoka D, Pintye J, McGrath CJ, Kinuthia J, Unger JA, Obudho N, et al. Uptake and correlates of contraception among postpartum women in Kenya: results from a national cross-sectional survey. *Contracept*. 2018 Mar 1;97(3):227–35.

21. Tafere TE, Afework MF, Yalew AW. Counseling on family planning during ANC service increases the likelihood of postpartum family planning use in Bahir Dar City Administration, Northwest Ethiopia: a prospective follow up study. *Contracept Reprod Med.* 2018 Dec;3(1).
22. Huber-Krum S, Khadka A, Pradhan E, Rohr J, Puri M, Maharjan D, et al. The effect of antenatal counseling and intrauterine device insertion services on postpartum contraceptive use in Nepal: Results from a stepped-wedge randomized controlled trial. *Contracept.* 2020 Jun 1;101(6):384–92.
23. Bhandari R, Pokhrel KN, Gabrielle N, Amatya A. Long acting reversible contraception use and associated factors among married women of reproductive age in Nepal. *PLoS One.* 2019 Mar 1;14(3).
24. Cooper M, Free CJ, Cameron S. Contraception after childbirth in the UK: beyond the COVID-19 pandemic. *Bri Med J Sex Reprod Health.* 2022;48(2):82–4.
25. Efendi F, Gafar A, Suza DE, Has EMM ah, Pramono AP, Susanti IA. Determinants of contraceptive use among married women in Indonesia. *F1000Res.* 2020;9.
26. Winda Oktari Pondawati L. Impact of The Covid-19 Pandemic on Contraception Users: A Scoping Review. *Women, Midwives and Midwifery.* 2022;2(2):1–8. <https://doi.org/10.36749/wmm.2.2.46-63.2022>
27. Arero WD, Teka WG, Hebo HJ, Woyo T, Amare B. Prevalence of long-acting reversible contraceptive methods utilization and associated factors among counseled mothers in immediate postpartum period at Jimma University medical center, Ethiopia. *Contracept Reprod Med.* 2022 Sep 2;7(1).
28. Siswosudarmo R, Nugroho N, Kurniawan C, Erlina Y, Ikarumi D, Hospital S. CuT 380A IUD Inserted by R-Insertor versus Ring Forceps during Postpartum Period: A Randomized Controlled Trial. *Indones J Obstet Gynecol.* 2020;8(1):1–5.