

Effect of COVID-19 on Access to Family Planning Care and Use of Contraceptive Methods in the Era of FP Clinics Closure and the Unexpected Rise of Unplanned Pregnancy: A Comprehensive Review

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Introduction

History of Family Planning

Family planning programs occupy great importance worldwide. Family planning programs are now in approximately all nations as of 1998, 192 countries with 99 percent of the world's population had some form of family planning program [1].

As countries have sought to deal with the "population problem" of rapid growth; by focusing on reducing fertility through family planning programs, which have been started in the 1960s [2].

In the 1960s, US foundations, international development agencies, and governments in several developing countries sought to establish programs to distribute contraceptives on a large scale, fearing the potential consequences of rapid population growth. Moreover, the development of two new contraceptive methods - the OCPs and the IUD- encouraged that effective and inexpensive contraception could be available widely [1].

When we talk about family planning programs, we consider three objectives to be achieved:

- A demographic goal was reducing fertility rates and slowing population growth, especially for developing countries.
- The health goal is decreasing the adverse health consequences of high fertility for mothers and children.
- Human rights goal that individuals have the right to control reproductive decisions, including family size and timing of births [3].

Coronavirus Disease-19 (COVID-19)

The new coronavirus was labelledofficially by the world health organization (WHO), coronavirus disease 19 (COVID-19). Furthermore, the International Committee on Taxonomy of Viruses has proposed SARS-COV-2 as the term of the virus that causes Covid-19. Covid-19 has large numbers in cases and deaths, especially from its first identifications in Wuhan, China, in December 2019 [4-6]. Throughout our experience of earlier human coronavirus outbreaks (the severe acute respiratory syndrome coronavirus (SARS-COV) and the middle east respiratory syndrome coronavirus (MERS-COV), coronaviruses are RNA single-stranded, nonsegmented, enveloped and nonsegmented viruses, which trigger disorders varying from the common cold to critical and deadly illness [4]. The primary mode of transmission is through close contact with an infected person by inhalation of respiratory droplets, while fecal-oral transmission via contaminated fomite on surfaces has been recorded [7].

In the middle of this growing outbreak that could have significant effects on our public health and medical infrastructure, the unique needs of pregnant women should be included in preparedness and response plans. In former outbreaks, physicians were hesitant to treat or vaccinate pregnant women due to the worries on fetal safety [8]. Although the generated evidence is inadequate, there is no confirmation from other severe coronavirus infections (SARS or MERS) that pregnant women are more prone to infection with coronavirus. Thus far, in this outbreak of novel coronavirus infection, men have been more affected than women [9-12].

Viral pneumonia is one of the most important causes of morbidity



and mortality among pregnant women [13]. In the meanwhile, the Covid-19 pneumonia clinical features in pregnant women were similar to those of non-pregnant adult patients with Covid-19 pneumonia [14].

Effect of COVID-19 on Fetuses and Newborn with the Possibility of Vertical Transmission and Mother to Newborn Transmission

Little data are available about Mother-To-Newborn Infection With COVID-19, while vertical transmission of infection has not been noticed in either SARS-CoV-1 or MERS-CoV [4].

In a series of nine pregnancies with ten infants (one set of twins) reported by Zhu H, et al. (2020) [15], the onset of symptoms was before delivery (1-6 days) in four subjects, on the day of delivery in two subjects, and after delivery (1-3 days) in three subjects. Amongst the nine pregnancies, intrauterine distress of the fetus was recorded in six patients, seven delivered by C-sections, and six infants were born preterm. Based on the above and the existing information from other respiratory pathogens such as SARS and influenza, it is indefinite whether COVID-19 infected pregnant women will undergo more severe diseases [4].

In a study by Chen H, et al. (2020) [14], nine women were diagnosed with Covid-19 during the third trimester of pregnancy. In all women, the pregnancy was terminated by cesarean section, four women gave birth prematurely, but none before 36 weeks of pregnancy [14]. The condition of the newborns assessed on the Apgar scale was 8-9 after one minute and 9-10 after five minutes. The presence of SARS-CoV-2 was evaluated in six out of nine cases in amniotic fluid, breast milk, umbilical cord blood culture, and newborn's throat swab culture. All tests were negative [14].

In a study by Zhu H, et al. (2020) [15], in nine pregnant women (eight single pregnancies, one twin pregnancy) with confirmed COVID-19 infection. The clinical symptoms developed in four cases before delivery, in two cases on the day of delivery, and in the remaining ones after childbirth (seven cesarean sections, two natural deliveries). Six women gave birth prematurely, and four delivered on time. Although none of the newborns was confirmed to be infected, six had dyspnea, two had a fever, two had thrombocytopenia with associated normal liver function, one had increased heart rate, one had vomiting, and one had a pneumothorax, while One of the newborns died [15].

Zhang L, et al. (2020) [16], performed a retrospective analysis comparing the results of pregnant women infected with SARS-CoV-2 with pneumonia (n=16) and 45 without pneumonia. Only one of the patients with pneumonia had a severe condition. The methods of delivery in both groups were cesarean sections, and the weeks of pregnancy were (38.7±1.4) weeks and (37.9±1.6) weeks, with no significant differences found. There was also no difference in intraoperative blood loss or neonatal weight loss. None of the newborns was infected, and there were no differences in the condition of the newborns [16].

There are nine small case series (all from China) and two case reports, including a total of 65 pregnant women (67 neonates) who were infected with SARS-CoV-2 during pregnancy [14,15, and 17-24]. The number of women in each case series varied between two and 16. Two women were infected at 25 and 27 weeks of pregnancy, whereas the remaining were during the third trimester. Three women were discharged; the remaining delivered between 30 and 40 weeks of pregnancy, mostly by Cesarean section (88%). Fetal distress was

reported in 31%. A total of 38% of women delivered preterm [22,23]. Neonatal complications included respiratory distress or pneumonia 18%, low birth weight 13%, rash 3%, disseminated intravascular coagulation 3%, asphyxia 2%, and perinatal death 3% [15,23].

SARS-CoV-2 could not be isolated from amniotic fluid, placenta tissue, vaginal swabs, cord blood, breast milk, or neonatal nasopharyngeal and throat swabs in 27 mother-infant pairs [14,15, and 17-23]. However, one healthy neonate and three neonates who acquired pneumonia assessed as positive on the nasopharyngeal, anal swabs, and throat on the second and fourth day of their life [24], which was despite the strict control of infection, protective techniques during delivery, and separation of mother from neonates. Additionally, three neonates whose mother presented with COVID-19 infection, 23 days before delivery, were found to have immunoglobulin M and G against SARS-CoV-2 at birth [17,25].

Studies, published so far on pregnant women infected with SARS-CoV-2 and experiencing COVID-19, did not allow definite conclusions on the clinical course or the condition of the mother and the newborn [26]. Presently, no evidence has been collected, proving that SARS-CoV-2 has caused the intrauterine or transplacental transmission to the fetus [27]. From the scarce provided studies, in caution, we can assume that vertical transmission of the maternal infection through the third trimester probably does not occur or likely occurs very rarely. However, the penalties of COVID-19 infection on women during early pregnancy stay mysterious. We do not know whether the virus may be vertically transmitted to the fetus (causing congenital malformations, growth abnormalities, disruption of fetal organs), leads to fetal loss early, abortions, or induces the premature onset of labor [28].

There is a high risk of breastfeeding due to transmission of COVID-19 through respiratory droplets from infected mother to newborn. There is a remarkable issue, particularly in maternity hospitals, which was represented by the risk of mother to child transmission of COVID-19 virus through respiratory droplets during breastfeeding. Thus, direct breastfeeding is prudent, ensuring strict measures of infection control (often washing mother's hands before touching the infant and wearing a face mask), and it's suggested that SARS-COV-2 positive mothers must be isolated from newborns until viral shedding clears [29,30].

The center for disease control and prevention (CDC) has developed interim guidance on breastfeeding for a mother confirmed or under investigation for COVID-19 [31]. Uptill now, there is little evidence of mother-to-newborn infection with COVID-19. However, it is highly regarded that Covid-19 transmission occurs through respiratory droplets during breastfeeding but not through breastfeeding itself [4].

Pregnancy Considerations of COVID-19 Medications

There are many investigational medications used in patients with COVID-19 that have some pregnancy considerations. They are:

Chloroquine or hydroxychloroquine: Chloroquine phosphate, an FDA-approved antimalarial drug, has been used clinically for more than 70 years. Hydroxychloroquine is a new antimalarial drug developed by scientists on the basis of chloroquine. Anti-rheumatic doses of chloroquine and hydroxychloroquine have been used safely in pregnant women with SLE [32]. Hydroxychloroquine has not been associated with adverse pregnancy outcomes in ≥300 human pregnancies with exposure to the drug. A lesser dosage of chloroquine (500 mg once a week) is utilized for malaria prophylaxis within pregnancy [32]. Although chloroquine is classified as class C in the



FDA for pregnancy, the effect of chloroquine on pregnancy is proved to be mild, and records in WHO do not show any adverse effects of chloroquine on pregnancy, childbirth, or newborns [33]. A meta-analysis conducted on hydroxychloroquine, included seven cohort studies and one RCT, showed no significant increase in rates of major congenital, craniofacial, genitourinary, cardiovascular, or nervous system malformations neither of stillbirth or prematurity [34].

Remdesivir: The safety and effectiveness of remdesivir for COVID-19 treatment have not been evaluated in pregnant patients, so using remdesivir in pregnant patients only if the potential benefits overcome the potential risk for the mother and the fetus [35].

Oseltamivir: Oseltamivir (Tamiflu) is an approved drug for treating influenza A and B. There are not enough data to inform a drug-associated risk of adverse developmental outcomes; however, in a population-based study conducted on 946,176 pregnancies in Denmark from 2002 to 2013 of which 1898 were exposed to oseltamivir during pregnancy, the authors found no increased risk of any major congenital malformation, fetal death, preterm birth, SGA or low 5-min APGAR score [36]. Oseltamivir could be considered compatible with pregnancy in all trimesters if proven effective in COVID-19 treatment [37].

Lopinavir/Ritonavir: There is vast experience with the use of lopinavir/ritonavir in pregnant women with HIV. The drug has an adequate safety profile with no evidence of human teratogenicity (can rule out a 1.5-fold increase in overall congenital disabilities) [32]. An open-label, randomized controlled trial reported that lopinavir/ritonavir was not associated with an increased risk of preterm compared with efavirenz, except for nutritional factors [38]. In addition, Results from 955 women exposure to lopinavir/Ritonavir during pregnancy showed that the prevalence of the congenital disabilities in infants with prenatal exposure to lopinavir/ritonavir was not significantly different from that in internal or external controls [39].

Interferons (IFN- α and IFN- β mainly): Data from several large pregnancy registries demonstrated no association between exposure to interferon-beta-1b preconception or during pregnancy and an increased risk of adverse birth outcomes [32]. A meta-analysis conducted to observe if interferon type I (mainly includes IFN- α , β , κ , and λ) has adverse effects on patients with primary thrombocytopenia during pregnancy. The results showed that IFN- α did not significantly increase the risk of malformations, miscarriages, stillbirths, or premature births [40].

Janus Kinase Inhibitors (e.g., Baricitinib): The incomplete records of humans on the consumption of baricitinib are deficient in appraising the drug-associated hazard for chief birth defects or miscarriage. In the studies made on animals about embryo-fetal growth, there was increased embryo lethality in some species that were given baricitinib at very high doses above the recommended dose for humans [41].

Interleukin-1 inhibitors (e.g., anakinra): There is limited evidence about the use of Interleukin-1 inhibitors (IL-1) in pregnancy, but unintentional first-trimester exposure is unlikely to be harmful [42]. According to an International multi-centre study of pregnancy outcomes with interleukin-1 inhibitors, the use of interleukin-1 inhibitors may not significantly affect pregnancy outcomes or infant development. The investigators identified a total of 43 pregnancies exposed to IL-1 inhibitors in seven countries, including 14 with canakinumab (8 maternal) and 29 with anakinra (23 maternal). For

canakinumab exposure, eight pregnancies ended in the delivery of seven healthy infants with ideal gestational age and birthweight. There were 23 anakinra-exposed pregnancies ending in 21 healthy infants' birth, and one baby developed unilateral renal agenesis and ectopic neurohypophysis [43].

Interleukin-6 inhibitors (e.g., sarilumab, siltuximab, tocilizumab): There are inadequate data to conclude if there is a drug-associated danger for foremost birth defects or miscarriage. A study analysis showed pregnancy-related citations of 399 women subjected to tocilizumab just before or during pregnancy, with pregnancy results being described in 288 pregnancies (72.2%). The authors observed no indication for a substantially increased malformation risk, but the data do not yet prove safety [44].

Antithrombotic Therapy

The preferred anticoagulants during pregnancy are heparin compounds [45]. Because of consistency reliability and effortlessness of administration, low-molecular-weight heparin is advised rather than unfractionated heparin for the prevention and treatment of venous thromboembolism in pregnancy [46]. There are limited safety data about direct-acting anticoagulants in pregnancy, so they are not routinely used during pregnancy [47]. Physicians should avoid prescribing warfarin for prevention or treatment of venous thromboembolism in the pregnant, especially during the first trimester, regardless of their COVID-19 status; this is due to the fear for teratogenicity. Due to the potential risk of maternal haemorrhage, during pregnancy, thrombolytic therapy should be reserved for acute pulmonary embolism with life-threatening hemodynamic instability regardless of whether a patient has COVID-19 [32,47].

Crowdedness and Infection

Overcrowding in health care places such as hospitals causes the spread of infectious agents transmitted by droplets or air born transmission; this infection can affect patients or physicians treating them. Measures have been taken in many countries for the closure of non-emergent health care places to decrease overcrowding and infection transmission [48].

Studies were done on 993 physicians and nurse (mean age 42.2 years) in 5 acute care hospitals in Finland and 1102 patients using routine monthly collected data about these persons' sickness, use of antibiotics and work absents; there was potent relation between overcrowding and infectious diseases spread [49].

A Covid-19 pandemic can affect reproductive health in different ways; it can cause preterm labour, abortion, intrauterine fetal growth restriction in a pregnant woman, so systemic screening and follow up should be done carefully for pregnant [30]. Women may have difficulties in getting health care services due to increase possibility of infection, such as a COVID-19 pandemic [50].

Health systems should provide maternity services to make sure that women receive essential care, provide infection control measures, detection, and isolation of infected cases to prevent infection spread to other patients and staff members. In inadequate health systems, these measures may not be available, especially in the presence of the COVID-19 pandemic, which leads to the disruption of essential health services. Maternal and reproductive emergency services may severely be affected due to deficiency of isolation areas for assessment and examination of women in labour and newborns and lack of operation rooms; equipment leads to decrease life-



saving procedures such as cesarean sections and different obstetric emergencies. Lack of infection control in some health care centres used to isolate patients is a cause of COVID-19 spread [51].

Unavailability of maternal health services in all areas forces women to travel for long distances, which may expose them to infection [52]. Factories closure and stoppage of transport due to pandemic leads to decrease medical supplements such as condoms, intrauterine device, contraceptive pills which threatens family planning regimens [52,53].

COVID-19 and Abortion

Due to the COVID-19 pandemic, it has been observed that the sexual desire and the rate of sexual intercourse notably increased. Additionally, it has been linked with a decreased desire for conception, and a reduced rate of using contraceptive methods by females [54]. According to the New York Times newspaper, the rate of domestic sexual abuse has been notably increased during the pandemic [55]. Moreover, it has been claimed that the pandemic is considerably linked with delay in manufacturing, delivery, and the consumption of contraceptive methods [56-58]. All of these have been linked with an increased rate of unplanned pregnancies [57].

That makes "Abortion" an essential medical service during the pandemic; on the other hand, there is a notable decrease in this service due to the pandemic [57]. This reduction is for many reasons such as the closure of the abortion clinics because they consider "Abortion" as unessential health service and claims that will provide more personal protective equipment (PPE) for the medical personnel treating COVID-19. On the contrary, this reason is not very logic, because the pregnant females if still pregnant will need many essential health services such as prenatal, natal, and postnatal care which will require more (PPEs) than the abortion service needs. Alternatively, the pregnant female may induce an abortion by herself with unsafe methods, which may lead to serious medical events which also will need a special medical service, and more (PPEs). So, both conditions will have enhanced risks for both the medical personnel and the patients [57].

According to a policy analysis from Guttmacher Institute based on data from 132 LMICs, including 1.6 billion women of reproductive age (aged 15-49), they reported that a 10% decrease in contraceptive use would lead to an extra 49 million women who don't use modern contraceptive methods. They also stated that if 10% of safe abortions converted to unsafe because women cannot have safe abortion health service due to countries lockdowns and closure of healthcare clinics, that will lead to a 3 million increase of unsafe abortions and more than 1000 maternal deaths [59].

Another possible, cause for the declining in the use of contraceptive and abortion health services, exists in some countries such as India where these services are not taken as priorities by many families; in addition, the males who make a choice about travelling to use these services and the use of these services itself, not the females who will lead to an increase in unwanted pregnancies and unsafe abortions [58].

Finally, we should mention that the response for the COVID-19 pandemic leads to considerable financial suffering for many families, and the lack of adequate financial support for the care of a child (or an extra child) is a fundamental cause for families to choose to have an abortion [60]. So "Abortion" should be considered as an essential elective health service during the Covid-19 pandemic.

Effect of COVID-19 on Contraceptive Methods that need Health Care Providers

Contraceptive and family planning services and supplies are fundamental components of essential health services; however, in response to the pandemic, the distribution of contraceptive products and services, and the operation of distribution chains have been interrupted [61]. Transportation is vital in several settings, as even reaching a facility for delivery becomes a challenge in countries in sub-Saharan Africa and parts of Asia, where the media has declared deaths amongst women who walk long distances for getting birth support when a patient cannot obtain the preferred technique because of necessary COVID-19 restraints [61,62].

We must search for access to all contraceptive options; providers need to educate and counsel about alternate contraceptive methods to prevent this pandemic from leading to more short-interval and potentially undesired pregnancies [62]. We must create protocols for health care. There was degree variability across programs contraceptive care). Some programs focused on encouraging hormonal methods via telehealth. We must Preserve access to all contraceptive options that will decrease unintended pregnancies & abortion, so it is imperative to provide user-controlled methods of contraception (e.g., pill, patch, and ring) and emergency contraception as desired [62]. Consultations and new prescriptions for short-acting methods can occur safely by utilizing telemedicine. Some were prescribing Depo-Provera and considering a clinic visit for injection as an essential visit, also suggesting strategies for patients to receive Depo-Provera without clinic visits (e.g., pharmacy visits, teaching self-injection [62]. In general, IPP LARC is safe, effective, and well supported by data and patient satisfaction. Facilitating IPP LARC would benefit patients, providers, and institutions, especially during a time when outpatient visits are limited IPP LARC should be an option for all women following delivery, preserving it where existing and implementing it when a patient desires to have a LARC insertion or removal, and the region is able to accommodate outpatient visits, LARC visits need to occur now it is hard to use LARC due to contemporary circumstances as COVID-19 infection [62], so it is time to replace LARC with telehealth for counseling and screening Use various communication methods that do not require-person contact (SMS, electronic medical records WhatsApp, video calls, or telephone call to Counsel new clients requesting contraception and to screen for medical eligibility [63]. Counsel on fertility awareness methods and correct and consistent condom use in case disruptions occur in the supply of other contraceptive commodities Counsel current LARC users on the effectiveness of extended use beyond the labeled duration, postponing routine removals [63]. Educate clients on emergency contraception, including both over the counter and prescription options to diagnose and Issue new prescriptions and refills for clients who desire user-controlled contraceptives (e.g., combined oral contraceptives, progestin-only pills, contraceptive patches, or vaginal contraceptive rings) if no contraindications are evident. Send all prescriptions directly to the pharmacy or clinic to limit contact [62].

Telemedicine

Telemedicine (TM) is apprehended as a unified system of healthcare deliverance that implies telecommunications and computer technology as an alternative to face-to-face contact between clinician and patient using numerous communication approaches that do not require in-person contact (SMS, WhatsApp, video calls, or telephone calls). While video visits are preferred, if not available, a telephone call could be sufficient [64]. Contraceptive counseling through telemedicine



is a favorable option for patients who are at increased risk of morbidity during the COVID-19 pandemic, including patients with asthma, chronic obstructive pulmonary disease, and immunocompromised patients. Telemedicine has a wide range of benefits includes connecting patients with providers at a distance, improved access to services, and increasing care delivery, reduced healthcare costs [65].

Nevertheless, telemedicine has some disadvantages. The use of telemedicine comes with the risk of the teleconsultant failure to provide the standard care required. Another threat includes the inadequacy of the telemedicine system in a critical moment [66]. Other possible disadvantages of telemedicine use are the interruption of the relationship between healthcare providers and patients and issues concerning the quality of health information [65].

Even though the utilization of TM has multiplied over the last two to three years, strains affecting using telemedicine are still there. That includes patients would prefer that they see their provider through TM versus someone with whom they do not have a previously established relationship. Patients may be unaware that they have TM as an option and do not know how to access it [67]. The technical requirements for a successful telemedicine program include secure, high-speed Internet connection, patient access software, and access to IT professionals to set up the program which may not be available at all conditions [68]. In order to overcome the barriers, that affect using telemedicine for contraceptive counselling, people should be educated that TM is an adequate safer substitute under the current circumstances, making people aware that a TM benefit exists, with step-by-step instructions on how it can be used, helping people understand how TM works and continuing to reduce cost barriers to accessing TM [67].

Due to the spread of COVID-19, in-person meetings are limited. While the healthcare amenities of various countries are becoming burdened, several countries have instigated laws to restrict people's activities as well as imposing quarantines. Healthcare personnel are reallocated to be capable of delivering healthcare for entities affected by the pandemic. So, healthcare providers should start using telemedicine whenever possible to ensure delivery of contraceptive services to women and girls [63].

Telemedicine could be used in counselling new clients for different contraceptive methods, giving new prescriptions and refills with sending prescriptions directly to the pharmacy, counselling clients about long-acting reversible contraceptives and locations providing them as IUD to limit the time required for the in-person visit, assessing and management of possible side effects, counselling about fertility awareness and using of emergency contraception including both over-the-counter and prescription options [63].

The following visit types can be conducted over telemedicine: contraceptive counselling: initiation or maintenance of oral contraception, transdermal patch or vaginal ring, provision of oral emergency contraception (EC). Telemedicine allows access to many forms of contraception, such as combined oral contraceptive pills, progestin-only contraceptive pills, contraceptive vaginal rings, contraceptive patches, condoms, and emergency contraception [63].

Healthcare providers should review each patient's medical history and assess for contraindications and concurrent medication use. Estrogen-containing methods (combined oral contraception, transdermal patch, and vaginal ring) are contraindicated in hypertensive and migraine with aura patients. So, individuals should have blood pressure checked prior to initiation, and annually with

continued us [70].

Another possible use of TM is to assess and manage common contraceptive side effects, such as breakthrough bleeding with hormonal contraception and informing the patient about the alerting symptoms of complications and when to stop the method [69].

Conflict of Interest

The authors declare that they have no conflict of interest.

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