# Digitalisation in ART for Inclusivity: Through the Rights-based Lens of Commissioning Parents

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**ABSTRACT**

There have been various technological advancements in Assisted Reproductive Technology (ART) since the Louise Brown was born in 1978 in the United Kingdom. Among these developments, the digitalisation of ART has been significant which has experienced humungous growth in contemporary years. Although digitalisation has many advantages for commissioning parents in the ART procedure, like time efficiency, cost savings, personalised treatment, and feedback, the medics and clinics involved in ART do not treat them as important stakeholders in the whole process. Therefore, the extent of their inclusion in the ART process through digitalisation is one of the concerns that needs to be studied through the lens of their human rights. Against this background, this research paper intends to explore the impact of digitalisation in ART on the human rights of the commissioning parents through the lens of inclusivity. The study hypothesises that digitalisation in ART has led to inclusivity for the commissioning parents in the process, wherein it has also created privacy and surveillance-related concerns affecting their human rights. Based on this assumption, the study is divided into four major parts. Firstly, it deals with the ART, its nature and scope, technological advancement in ART and digitalisation; secondly, it highlights the role of the commissioning parents as one of the important stakeholders and their rights in the ART process; thirdly, it focuses on the usage of digitalisation for the commissioning parents; and fourthly, the role of digitalisation in their inclusion in ART, fifthly, the gaps and challenges in such inclusion and finally the conclusion and way forward. The methodology used in this paper is doctrinal, based on related laws, reports of national and international agencies, scholarly articles, newspaper articles, case laws, and books, among other sources.
**Key Words:** Digitalization, Assisted Reproductive Technology, Commissioning Parents

## 1. INTRODUCTION

The capacity of humans to preserve information on various materials (such as wooden and bone sculptures) dates back thousands of years. The development of computers and code-cracking at Bletchley Park in the 1940s marked the beginning of digitalisation, also known as computerisation. A revolution began in society when the personal computer (PC) was introduced in the 1980s and utilised by just one person. The advent of the internet and web browsers in the 1990s opened up a whole new world of information, knowledge, and services for the average person [1].

Further, ART is a vast pool of medical treatments used primarily to treat infertility. It covers techniques including In Vitro Fertilisation (IVF), intracytoplasmic sperm injection (ICSI), gamete or embryo cryopreservation, and the use of fertility drugs. Even though the profession of endocrinology has changed significantly since its inception; from the advent of information technology, one area that has had a significant impact on ART is digitisation. Digitalisation could be advantageous for the stakeholders in ART, especially for the commissioning parents in the procedure, like cost and time efficiency, personalised care, procedure, and treatment, followed by specific feedback. Furthermore,

clinics can prescribe drugs to commissioning parents online by tracking their daily routines using cell phones and wearables. A large portion of infertile couples can now access ART due to digitalisation, which has also helped them save time, money, and effort compared to travelling to clinics and disrupting their work.

Though digitalization has taken place in the field of ART, medical professionals and clinics still do not utilize the same to involve them equally in the process and treat them as important stakeholders in the whole procedure. Moreover, digitalisation has also presented conundrums for commissioning parents, for instance, privacy concerns, internet access in remote areas, and inadequate care through virtual consultations. Thus, the extent of their inclusion in the ART process and these issues need to be studied through the lens of their human rights.

Against this background, this research paper aims to explore the impact of digitalisation in ART on the human rights of the commissioning parents through the lens of inclusivity. The study is based on the hypothesis that digitalisation in ART has led to inclusivity for the commissioning parents in the process, wherein it has also created privacy and surveillance-related concerns affecting their human rights. Based on this assumption, the study is divided into four major parts. Firstly, it deals with the ART, its nature and scope, technological advancement in ART and digitalisation; secondly, it highlights the role of commissioning parents as one of the important stakeholders and their role and rights in the ART process; thirdly, it focuses on the usage of digitalisation for the commissioning parents; fourthly, the role of digitalisation in their inclusion in ART, fifthly, the gaps and challenges in such inclusion and finally the conclusion and way forward. The methodology used in this paper is doctrinal, based on related laws, reports of national and international agencies, scholarly articles, newspaper articles, case laws, and books, among other sources.

## 2. ART: NATURE AND SCOPE

Infertility is an issue for a large percentage of couples. According to a WHO report released on April 3, 2023, 1 in 6 adults across the world experience infertility [2]. To cope with this issue people resort to various methods of ART. In the case of ART, sexual interaction is circumvented, and the fertilisation of oocytes occurs within a controlled laboratory environment [3]. ART doesn't include procedures that simply deal with sperm, like artificial or intrauterine insemination, or where a woman uses medicine to boost egg production without thinking about egg retrieval [4]. The various procedures encompassed within ART are associated with controlling eggs or embryos in a medical context. This typically engages the surgical extraction of eggs from a woman's reproductive tract, followed by its fertilisation with the sperm in a lab. Subsequently, the fertilised eggs may be re-implanted into the same woman's body or transferred to another woman, constituting integral components of ART techniques. The term ART encompasses a broad spectrum of procedures, which are as follows.

1 **Intrauterine insemination [IUI]:** Individuals with coital dysfunction, mild male factor (TMF of 1–5 million/ml) or a semen count of approximately 10-15 million/ml, or a 10% cause of infertility. On the day of IUI, the semen preparation is completed, and a specialised catheter is used to inseminate the semen into the uterus. One cycle has a success rate of about 15% [5].

2 **In-vitro fertilisation [IVF]:** This method involves administering daily gonadotropin injections for 10–12 days to achieve regulated ovarian stimulation. The male partner obtains a sample of semen in the lab while the female partner administers anaesthesia to extract oocytes from the ovary on the day of ovum pickup. Thousands of essential motile Sperm are paired with eggs

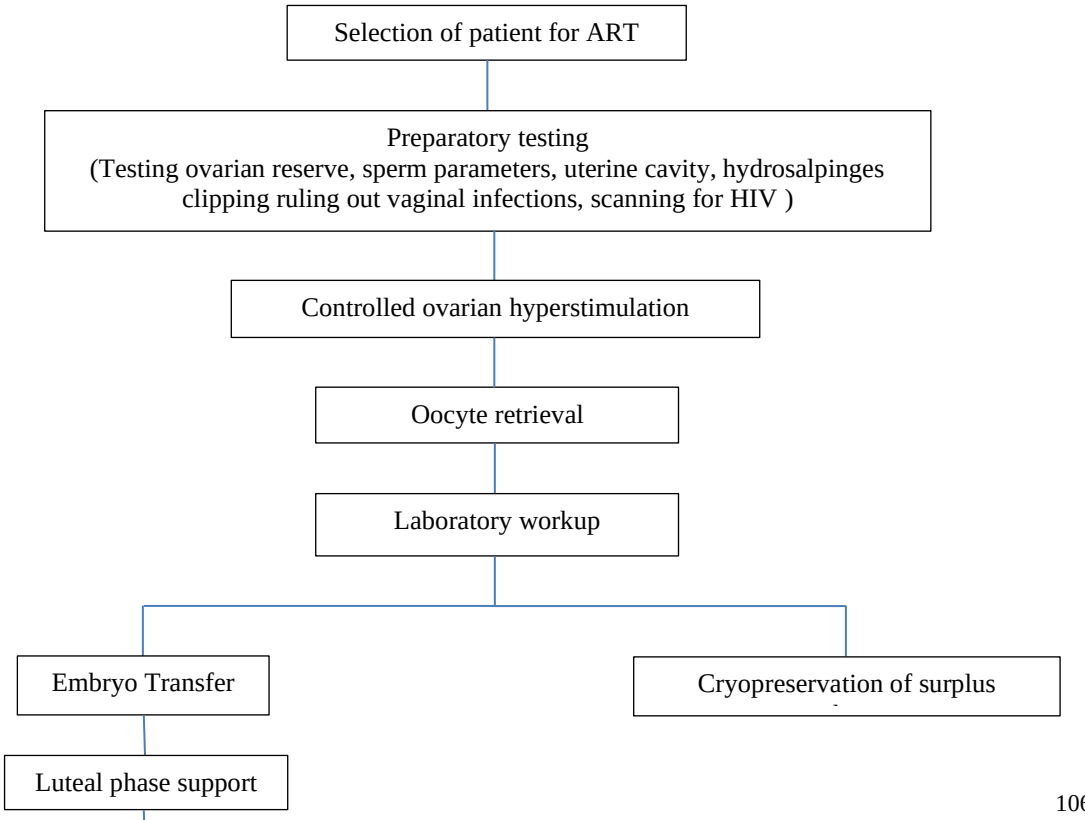
during outdoor fertilisation in the lab to ensure successful fertilisation. The best-growing embryos from this process are cultivated and transferred into the uterus to aid conception [5].

3 **Intra Cytoplasmic Sperm Injection [ICSI]:** This method is more sophisticated than traditional IVF. The process of obtaining gametes and Sperm is the same as that of IVF. However, after that, sperms are injected straight into a single fully grown oocyte rather than combining Sperm and oocyte in a lab [5].

4 **Preimplantation genetic testing [PGT]:** This advanced test involves taking a biopsy of the growing embryo on day three or day five and sending the cells to be tested for genetic abnormalities. Couples who have a known family history of a significant illness or genetic abnormality and are unsure about passing it on to their children typically choose this route [6].

5 **Cryopreservation:** The IVF sector has been revolutionised by this procedure. It suggests storing Sperm, eggs, and embryos at -196°C for later use. This method can also help with improved IVF cycle planning [7].

Below is the flowchart that describes that initially when the commissioning parents go to the infertility clinic various tests are done in order to find out the reason of their infertility and once it is discovered Controlled Ovarian Hyperstimulation which involves the giving of either oral or injectable medicines in order to generate ovulation in the female patient and thereafter oocytes are retrieved which are then sent to the laboratory after which they are then mixed with sperm and the resulting embryo is then either cryopreserved or transferred into the uterus and if is transferred then luteal phase is supported with progesterone, hCG (Human chorionic gonadotropin )or gonadotropin releasing hormone to improve success rates and thereafter pregnancy is diagnosed [8]



Pregnancy diagnose

**Figure 1: Selection of patients for ART**

## 2.1. Technological advancement in ART

Technological advancements have taken place in ART such as the utilization of luteal phase support, controlled ovarian hyperstimulation, and enhanced culture medium have taken place in ART quickly followed by other noteworthy developments such as the creation of aided hatching and ICSI. These developments raised the number of people who might potentially explore infertility treatments and enhanced the success rates linked with ART. Nevertheless, there were some unfavourable tendencies in the usage of ART throughout this time. The long-term risk of patients developing ovarian hyperstimulation syndrome (OHSS) and/or a significant rise in the chance of multiple gestation pregnancies were two of the main issues that surfaced during the development of ART [9].

Another development in ART is in the field of digitalisation. Digitalisation is the blueprint or process whereby the digital technologies are utilised, resulting in changes of deeper nature that can modify economic paradigm of the business models. Ultimately, these changes lead to opportunities for increased productiveness and income [10]. Digitalisation aims to leave no facet of human existence unaffected. The persons accessing it can share intelligence and data and communicate by remaining online without decreasing their competence in accomplishing their work. These attributes of digital technology have driven the world to go online. The following technological advancements have taken place in the field of ART in terms of digitalisation:

**1-Decision support tools**-Digitalisation has provided contemporary tools that aid in planning via a consolidated electronic medical record that allows AI-assisted, predictive logical tools to advise clinician decision-making. The electronic medical record can cross reference pre-treatment patient attributes such as age, weight, and Body Mass Index to diagnostics outcomes which has helped IVF clinics. A digital IVF clinic that includes an online donor bank for gametes and embryos and explore functions for donor attribute has given patients the potentiality to make judgements from home [11]. The tracking and tracing of biological items has become possible via the means of electronic witnessing systems. Using the wrong gametes or embryos can be prevented by using electronic witnessing systems. This technique has also led to the expansion of radio frequency identification tags, which had the ability to function at cryogenic temperatures [12][13]. Tools to ascertain the optimal day for injection have been used. Recommendation on the best dose of FCH cycle type, and whether to use an agonist trigger to prevent ovarian hyperstimulation syndrome [OHSS] has become more prognostic with large data sets [14]. The efficiency of decision support tools has also been explored in treatment options for the management of ectopic pregnancy which has been beneficial not only for the commissioning parents but also for the clinic. AI-assisted deduction tools can recommend the doctor and commissioning parents on whether to proceed with or discontinue IVF treatment [15]. With predictive modelling, digital platforms can analyse the chances of success for various treatment options based on the unique characteristics of each patient, assisting couples in making better decisions on their reproductive journey [11].

**2-Time lapse photography** -The process of ART has been digitally transformed with the help of time-lapse photography which has enabled careful monitoring of changes in the embryos via which the best embryo can be selected [16].

**3-DNA sequencing analysis** - The Oxford nanopore sequencing system utilises a very small DNA sequencing technology and has accomplished DNA sequence analysis which can be done even by using a smartphone [17]. Rare genetic diseases can be detected by facial recognition that correlates a person's physical traits to his genetic characteristics by utilising a medical healthcare software application known as the face-to gene [18].

**4-Speech recognition dictation tool-** The speech recognition dictation tool can be used in summarising all information related to patient pertaining to their appointments, their progress in terms of their recovery and even has the potential to translate the video recorded patient-doctor consultation.

**5-Internet of Things** -By means of connecting Internet of Things with technology such as ultrasound machine it has become feasible to capture follicle sound images and convert them in a digital form which are then transmitted via Digital Imaging and Communication in Medicine (DICOM) to IVF clinics. Via the means of technology such as 3D, follicles can be measured automatically, and data can be sent to IVF clinics. Moreover, data can be sent from the comfort of home through smartphone by using technologies such as home internal ultrasound devices [19].

**6-Analytical tools-** Tools for analysis have been used to anticipate the tendency of being absent in the employees in terms of the reason as well as the duration for which they might be absent and then analyse the effect of programs such as those of stress management to check the level of stress [20]. The use of Robotic process automation has proved to be very helpful in performing task such as updating patient enrolment and preparing invoice. The automatic working of the process of identity verification has helped in reducing administrative workload [11]. Supervision of inventory with the help of bar codes and sensors and self-operating ordering based on computerised work pressure has been efficient [21].

**7-Sperm sorting method-** Lab on-a-chip system that can perform many functions of a laboratory at a time ranging from mixing samples to giving test result, microfluidic devices with chemotaxis and image capturing potentialities have proved to be an ideal sperm classifying method [11].

## 3. ROLE AND RIGHTS OF THE COMMISSIONING PARENTS IN ART

Commissioning parents typically initiate the journey by seeking medical assistance to overcome fertility challenges, actively participate in decisions regarding treatment options, are deeply invested in the outcome of the procedure, as they eagerly anticipate the arrival of their long-awaited child. Thus, they have crucial roles to play. They also have legal rights ranging from taking their informed consent to establishing parentage and custody of the child born through ART, ensuring recognition of their role as the child's legal guardians. Herein, we would discuss their roles and rights one by one.

### 3.1-Role of commissioning parent

They play a crucial role in the process through decision-making revolving around the following:

1 **Pursuing ART:** Commissioning parents are the ones are facing infertility issues or any other condition necessitating medical intervention, and they have to decide whether and which method of ART to pursue when conception by natural means is unsuccessful [22].

2 **Medical Examination:** After deciding to undergo ART**,** the couple takes the initiative of going to a fertility clinic and undergo various medical examinations to determine the reason as well as cure for infertility in form of a suitable treatment to be performed accordingly.

3 **Choice of ART Procedure:** The commissioning parents work in tandem with the fertility specialists after their medical examination so as to find out that which treatment will work best for them. They have a wide range of options such as which include IVF, ICSI, Intrauterine insemination (IUI).

4 **Physical hardship:** The commissioning parents, especially women, have to go through a lot of physical pain and suffering in the form of hormonal injections for egg stimulation which have adverse effects on their bodies.

5 **Financial Considerations:** The commissioning parents also bear the cost of the treatment in terms of the costs of fertility treatments which includes charges for medicines, cryopreservation, cost of repeated cycles as after the failure of one cycle another cycle becomes indispensable, loss of their routine work, which can be very expensive [23].

6 **Legal Aspects:** The commissioning couples are involved in the legal process of ART as they have to give their informed consent, they are involved in grievance redressal mechanism through filing of complaints arising out of any dispute between them and the ART clinics, especially when using surrogacy and fulfilling their other legal requirements as to providing insurance coverage in favour of the egg donor as well as surrogates; not indulging in sex selection, trading in human gametes or embryos, commercial surrogacy or abandoning the child. They have the right to confidentiality; right to use of donor gametes; the right to be protected against any medical illness therefore screening of donors or surrogates is a prerequisite; right to cryopreservation; right over the child.

Thus, we can say that commissioning parents are involved in the whole process which makes them active participants in the ART process.

### 3.2. Rights of the commissioning parents

Apart from playing a crucial role in the ART process commissioning parents have various rights as well which they can claim against the organisation in which they are seeking treatment in cases of negligence or infringement of any rights. These rights revolve around the following issues:

1 **Informed Consent:** Commissioning couples have the right to clear and holistic information pertaining to the implications, benefits, perils, and potential outcomes related with the utilisation of digital technologies, tools, and platforms in their fertility treatment [24]. This right is given in the Hague Convention (1907), Universal Declaration of Human Rights (1948), Convention on

Human Rights and Biomedicine. [25][26][27] and in section 8 of the Assisted Reproductive Technology (Regulation) Act ,2021 among others [28].

2 **Privacy and Data Security:** Commissioning couples have the right to confidentiality and the safeguarding of their vital information. The right is enshrined in Article 8(1) of the European Convention on Human Rights, Article 17(1) of the International Covenant on Civil, political and cultural rights and many others [29]. Section 21(e) of ART Act protects privacy of commissioning couples, Section 43A of Information Technology Act deals with compensation for failure to protect data. Additionally, Section 72A of the IT Act also addresses penalties for disclosure of information in breach of lawful contracts [30]

3 **Right to Withdraw:** Commissioning parents can recede from the ART process at any stage, without any unwarranted pressure or ramifications.

4 **Non-discrimination:** All commissioning parents, regardless of background, should be treated fairly and without discrimination in digitalised ART. This right is provided in Articles 1 and 2 of the Universal Declaration of Human Rights (1949) and Article 26 of the International Covenant on Civil, political, and cultural rights [27][30]. Indian constitution prohibits discrimination under article 15.

5 **Feedback Mechanism:** Commissioning parents have the right to give feedback on their encounter with digitalised ART forum and processes which has helped in making ART mechanism better. There is no Indian law that deals with feedback mechanism.

6 **Custody and guardianship of the child**- By virtue of section 31 of The ART Act ,2021 the commissioning parents have the exclusive custodial rights over the child born via ART as a biological child.

Thus, we can state that commissioning parents have a whole gamut of rights which they can use against any organisation in case of negligence or infringement of their rights.

## 4. BENEFITS OF DIGITALISATION IN ART FOR COMMISSIONING PARENTS

Digitalisation provides parents with ample benefits in terms of saving their time, money, and energy, it has provided them with tools that help them in making treatment decisions and give feedback to the clinic in terms of their experience.

**1.Saves time:** The digitalisation of ART has streamlined the procedure of IVF clinics since they don't have to wait for long to get their medical records and medical histories to be inputted into the system. At least 2.5 hours every patient cycle is saved by virtue of enabling prescription changes on the basis of ultrasound results and lessening the time between a clinic and the patient receiving the result, automation, and patient-oriented solutions such as push notifications. Further, online consultations have saved a lot of effort as well as time. Furthermore , there are certain facilities that can be managed from the comfort of home such as the administration of medicine. [31].

**2.Psychological support:** Through the construction of online forums and support groups, digital platforms can help couples connect with others going through similar experiences, exchange information, and offer emotional support [32].

**3.Feedback based personalised care:** Patient subgroups can be used to assess tailored input to clinicians regarding pregnancy rates, providing insight into why certain doctors have more excellent life birth rates than others [33]. In a digitalised ART clinic feedback and mood monitoring can be captured immediately [34]. In this regard, social robots can be of significance in terms of tracking mood, extending emotional support, and even administering cognitive behavioural counselling that can help commissioning parents in lessening their negative felling pertaining to their treatment. With the support of tools whereby voice can be recognised automatically and translation of voice into text and use of transcripts can be done immediately, hurdles pertaining to language have been minimised. The digitalisation of IVF clinic has offered services such as providing online counselling both individual as well as group whereby commissioning parents have availability of nutrition experts and can seek redressal of all their queries. These attributes have assisted commissioning parents by letting them to convey personal information with doctors and seek therapy [15].

**4.Accessibility of treatment:** Digitalisation has made it easier for the commissioning parents to book their appointments, have virtual one to one session with the doctor, made e-prescriptions, diagnostics reports and images and electronic medication administration which have made accessing fertility care easier. The time and burden of visiting clinics can be decreased by ordering medications, vitamins, and ovulation kits online and receiving virtual assistance while giving injections [35]. Commissioning parents have easy access to a plethora of information regarding reproductive medical advancements, surgeries and therapies on digital platforms where fertility specialists can be consulted remotely [15]. With digital technology, such as genetic testing and molecular diagnostics, fertility treatments can now be more individually tailored to each couple's specific needs, improving the likelihood of success [36].

**5.New ways to gather and interpret data:** Since smartphones are so widely used, there is now an opportunity to harness patient-generated data from wearables, such as ovulation tracking. Wrist wearables that measure body temperature at night and record the thermometer reading of dual-phase of skin temperature during the ovulation. Wearables can also track other digital indicators like heart rate, activity level, and sleep quality. By including this information in the fertility database, more research on the connection between poor reproductive outcomes and sleep disturbances may be conducted [15]. This data can be sent to the clinic's online server, which will use it to supply prescription drugs [37]. Currently, commissioning parents use Bluetooth connectivity to communicate urine luteinising hormone results and download this information to fertility applications [38]. With digitalisation, patient records may be managed more effectively, guaranteeing that test results, treatment plans, and medical histories are readily available and safely preserved.

**6.Secure Platforms:** In order to keep data relating to commissioning parents safe digital systems can be designed in such a manner that it protects confidential information, guaranteeing privacy of the commissioning parents in the form of using encrypted data, limiting the access to the data only to doctors or commissioning parents or anyone authorised by them on their behalf [37] .We can say that digitalisation has many benefits for ART patients and if they use them appropriately it can be of immense significance to them.

## 5.INCLUSION OF COMMISSIONING PARENTS THROUGH DIGITALISATION

We can see that nowadays many such technologies have been invented which can break the barrier between commissioning parents and fertility clinics and they can access information related to their health very easily. Some of these technologies are as follows.

It is possible to easily modify many current technologies to increase the inclusion of commissioning parents in the digitalisation of ART. The virtual reality headset is one such gadget. Commissioning parents and fertility experts while being miles apart can still be together in the same room, because of the headsets [39]. There are various online Patient Portals whereby healthcare providers offer commissioning parents access to their treatment plan ranging from test result to prescription securely. These portals provide a centralized platform for communication with healthcare professionals. They enable virtual consultations between commissioning parents and healthcare providers. This is particularly valuable for remote monitoring, follow-up appointments, and discussions about treatment progress.

Secondly, the commissioning parent's heart rates and oxygen levels can be tracked by wearables. There are several products in the market for the tracking of hormonal levels from the comfort of home using saliva or urine; however, real-time monitoring may be possible if smartwatches incorporate hormone evaluation features [40]. Wearable sensors and fertility kits can gather data on relevant health metrics in real time which can then be shared with the IVF experts which will allow them to modify their treatment plans accordingly.

Thirdly, although it is still in development, technology enabling at-home pelvic sonograms is becoming closer to reality. With at-home ultrasonography technology, obtaining scanning would not require travelling long distances [41].

Fourthly, mobile apps designed for ART patients can offer features such as appointment scheduling, medication reminders, and access to educational resources. They can provide commissioning parents with educational resources, videos, articles, and FAQs related to the ART process.

Fifthly, a chatbot is a form of a communicating agent which communicates with commissioning parents via social media platforms such as Facebook Messenger, Slack, WhatsApp, and WeChat [42].

Sixthly, new avenues for getting donor sperm have been made possible by the internet age. For instance, obtaining sperm from sperm banks online that deliver sperm to different corners of the world has provided a great impetus to the ART industry as it is financially viable and requires less effort in searching for the sperm. Further, plethora of matchmaking websites permit single women and commissioning couples to connect virtually with possible sperm donors. Donors and recipients can readily get counselling to learn about the legal, social, and medical ramifications of gamete donation for themselves and their offspring. Some websites, like Free Sperm Donations Worldwide (FSDW), ask users to "report any donors suggesting otherwise" and only allow artificial insemination to be supplied. [43]. There are no restrictions on the number of children that can be born from a single man's sperm, and there is no organisation that maintains an account of treatment cycles that can establish the presence of any biological connection between the progeny and the donor when individuals make their arrangements online [44]. It has been demonstrated that electronic consenting software accompanied by video content enhances commissioning parents' satisfaction and comprehension of the IVF process [45].

Seventhly, the function of Electronic Health Records (EHR) Systems is to consolidate the patient data, making it easily available to IVF experts. This digital tool streamlines the exchange of information, ensuring that commissioning parents' medical history and treatment details are readily available to the entire care team [46].

Eighthly, Digital Consent and Authorization Forms streamline administrative tasks. Commissioning parents can electronically sign and submit necessary forms, ensuring efficient and secure documentation [47].

Ninthly, payment and billing Portals help commissioning parents understand costs, insurance coverage, and payment options. This transparency contributes to a more straightforward financial experience.

Tenthly, digitally transferring the QR code to one's smartphone helps the commissioning parents in receiving their medicines by allowing them to show it to their chemist who in turn then scans the QR code and gives medicines as per the prescription [48].

Thus, we can say that via the means of the above technologies the commissioning parents have been included in the process of ART but still, there is more room for improvement in this area as gaps and challenges are many.

## 6.GAPS AND CHALLENGES IN INCLUSION OF COMMISSIONING PARENTS THROUGH DIGITALISATION

The Digitalisation has offered various advantages as discussed above however there remain gaps and challenges that need to be addressed.

1. There's growing evidence that suggests certain digital health technologies could make inequality worse. For instance, there hasn't been any definite improvement in women's access to health resources when mobile health apps are used [49].
2. It is possible that digital solutions may not meet the needs of health care in rural areas as many believe that managing digital solutions is beyond their capabilities [50]. The challenges are caused due to the non-availability of the smart phone, internet and ignorance of digital know-how.
3. Deterioration of care and the rise in erratic, dyssynchronous treatment due to non-availability of physical supervision which can, at best, result in patient dissatisfaction and, at worst, cause harm from medical errors, incorrect prescriptions, and misdiagnoses. It can even lead to issues of mental health.
4. Clinics will need to invest in workflow procedures and staff that are more tech-savvy and comfortable with digital signature software without incurring more risk. Moreover, the maintenance costs associated with digitalisation may limit the ability of clinics to scale. For instance, how will rising expenses related to implementing digitalisation services be managed? Is the patient going to receive them? If so, how will that be in the best interests of the commissioning parents?
5. The coverage of malpractices done through digitalisation under insurance policy is a challenge. [51].
6. Whether the embryo being developed and implanted is theirs, the digitalisation process does not ensure.
7. Further, the security of an electronic discussion, concerns regarding safety and security are constantly present.

Thus, we can say that if we can remove the above gaps and challenges, we can go a long way ahead in including the commissioning couples in the process of digitalisation of ART.

## 7.CONCLUSION AND WAY FORWARD

The Digitalisation can remove obstacles to care, deal with any emergent issue and could provide for consultation when needed, save time, give personalised care but at the same time it does not meet the need of the people living in rural areas its maintenance cost is high, it can sometimes result in misdiagnosis among others.

The process of inclusion of commissioning parents through digitalisation in ART is gaining pace in the form of virtual consultation and appearance, digital monitoring of physiology, access to their medical investigation, diagnostic reports, and treatment plans securely, etc. The digitisation has enhanced tracking the routine of the commissioning parents and further enabling them with latest data to provide the best planning, treatment and care. It would be pertinent to have latest infra, tech-savvy staff and awareness among the patients on how to benefit in the best possible manner through digitalisation in ART.

Nonetheless, digitalisation-based policy making is required to ensure access to care for the commissioning women, especially in rural areas ensuring access to the smart phones, internet and digital know-how. The errors in treatment via digital mode must be minimised. In case of any maltreatment, the insurance policy must cover the same. Further, the digitized ART must be financially viable for the clinics. Furthermore, the digitized ART must assure the accuracy of the implanted embryo with the parentage of the commissioning parents. Moreover, the privacy and safety of the data must be ensured through digitized ART, ensuring patient safety and satisfaction.

Thus, the benefits are many, it is important to guarantee the patients' inclusion, ease and satisfaction through an effective digitalised ART.

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