



# To the Editors of the Journal of Fertility, Gynecology, and Andrology

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## Dear Editor,

Human communities are now struggling with the novel coronavirus disease (COVID-19) as a public health emergency of international concern (PHEIC). COVID-19 is the third coronavirus emerged in human populations during the past two decades (1). This pathogen first emerged as an acute respiratory syndrome Corona virus (SARS-CoV-2) in Wuhan, China, in December 2019 and was then spread throughout the world (2). To date, the COVID-19 pandemic is highly serious and worrisome all around the globe. Based on the records, 204,827,416 individuals were infected with the virus globally, among whom 4,327,519 cases died and 183,950,719 ones recovered until 11 August 2021 (3). The COVID-19 pandemic affects all segments of the population and has direct and indirect harmful consequences, particularly on vulnerable groups, including pregnant women (4). A systematic review revealed that COVID-19 infection was related to higher rate (and pooled proportions) of preterm birth, preeclampsia, cesarean, and perinatal death. Based on the findings, prenatal counseling of women with COVID-19 infection occurring during pregnancy should be enhanced (5). The indirect consequences of COVID-19 pandemic on pregnant women include reduced access to antenatal and postnatal care, that can affect the possibility of screening for physical or psychological issues such as high blood pressure or mental health issues resulting in maternal morbidity and mortality (6, 7).

One of the problems encountered by pregnant women in the face of COVID-19 is their lack of knowledge about various aspects of prenatal and postpartum care during the pandemic. In a study on 172 pregnant women in Turkey, 45% of participants were unaware or skeptical of the im-

pact of the pandemic on the delivery mode. Besides, half of the women (50%) mentioned that they had no idea or thought breastfeeding could be dangerous during the pandemic. Furthermore, most of the participants did not know whether COVID-19 could result in birth defects (76%) or preterm delivery (64.5%). It was concluded that counseling helps pregnant women overcome misleads regarding the COVID-19 outbreak (8). Pregnant women require support, consultation, care, and guidance regarding pregnancy, delivery, and postpartum similar to the situation prior to the pandemic (9). They also need to have access to continuous and accurate information appropriate to their needs. Studies have shown that failure to meet the educational needs of women during pregnancy is a risk factor for increased anxiety in them. Conversely, if the mother feels that her needs are being met, she will feel more in control and satisfied, her health problems may be diagnosed earlier, and the need for unnecessary visits to medical centers will be reduced (10). Therefore, providing proper education and training for pregnant women and facilitating their access to accurate information is important in improving their prenatal and postpartum conditions.

Considering the minimization of digital gaps and the emerging technology literacy era, E-learning is promoted, and learners can be educated via novel and exciting methodologies. E-learning is an approach to teaching and learning, representing all or part of the educational model applied, that is based on the use of electronic media and devices as tools for improving access to training, communication, and interaction and that facilitates the adoption of new ways of understanding and developing learning (11, 12). Today, programs related to medical sciences can be easily installed on smartphones, iPads, and other types of de-

vices. The majority of programs related to medical sciences can be simply accessed anytime and anywhere using electronic devices such as personal computers, smartphones, and iPads. Applied programs can provide differential diagnosis, therapeutic algorithms, information about drug dose and selection of antibiotics, and medical calculators. They can also be used for other health behaviors, including the use of novel learning instruments during pregnancy, oral and dental health, human papillomavirus (HPV) vaccination, and cessation of smoking (13).

There has been a growing interest in delivering prenatal and antenatal education by e-learning. Pregnant women and new mothers increasingly use the Internet to find information regarding pregnancy, delivery, breastfeeding, and maternal and child health (14). Systematic reviews have proved the acceptance of health programs and social media for supporting prenatal care, including promoting a healthy lifestyle and providing health information in different countries (15). Internet-based prenatal educational programs are found to be effective in alleviating maternal postpartum depression (16). Studies also showed that using mobile devices for health purposes can significantly improve the rate of exclusive breastfeeding, breastfeeding efficacy, and women's attitudes toward breastfeeding and reduce health problems in infants (17). As an example, Hui et al. (2021) evaluated the effect of remote prenatal education on the breastfeeding rate and prenatal program participation of pregnant women in rural and remote communities of northern Canada. They developed a prenatal educational website, social media prenatal chat groups, and support teams in three remote communities. The results showed that remote prenatal education is effective for increasing breastfeeding rates and participation in prenatal programs in remote and rural areas. The remote education remained active during the COVID-19 pandemic, suggesting that remote educational programs can be expanded to similar locations (18). Web-based prenatal and antenatal education classes are an appropriate response to the need to offer support to pregnant women during the COVID-19 pandemic (19). Appropriate mobile applications can be used to reduce anxiety related to COVID-19 in mothers, provide access to reliable information, and provide pregnant women with instant access to healthcare facilities and information related to COVID-19 self-care processes (20).

### Conclusion

E-learning methodology has been recommended due to the importance of education and its role in patient care, shortage of specialist human resources in the education section, shortage of treatment personnel and their high workload, particularly during the COVID-19 pandemic, financial limitations, time-consumption of traditional ed-

ucational programs, and features of E-learning including need-based learning, interest, cost-effectiveness, efficiency, accessibility, the possibility of watching videos anytime, lack of limitation in the number of times of watching videos, flexibility, appropriate design, learner-centeredness, and expandability.

### Footnotes

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### References

- Rodriguez-Morales AJ, Cardona-Ospina JA, Gutierrez-Ocampo E, Villamizar-Pena R, Holguin-Rivera Y, Escalera-Antezana JP, et al. Clinical, laboratory and imaging features of COVID-19: A systematic review and meta-analysis. *Travel Med Infect Dis.* 2020;**34**:101623. doi: [10.1016/j.tmaid.2020.101623](https://doi.org/10.1016/j.tmaid.2020.101623). [PubMed: [32179124](https://pubmed.ncbi.nlm.nih.gov/32179124/)]. [PubMed Central: [PMC7102608](https://pubmed.ncbi.nlm.nih.gov/PMC7102608/)].
- Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, et al. Clinical characteristics of Coronavirus disease 2019 in China. *N Engl J Med.* 2020;**382**(18):1708–20. doi: [10.1056/NEJMoa2002032](https://doi.org/10.1056/NEJMoa2002032). [PubMed: [32109013](https://pubmed.ncbi.nlm.nih.gov/32109013/)]. [PubMed Central: [PMC7092819](https://pubmed.ncbi.nlm.nih.gov/PMC7092819/)].
- Worldometer. COVID-19 Coronavirus pandemic. USA: Worldometers; 2021. Available from: <https://www.worldometers.info/coronavirus/>.
- Kotlar B, Gerson E, Petrillo S, Langer A, Tiemeier H. The impact of the COVID-19 pandemic on maternal and perinatal health: A scoping review. *Reprod Health.* 2021;**18**(1):10. doi: [10.1186/s12978-021-01070-6](https://doi.org/10.1186/s12978-021-01070-6). [PubMed: [33461593](https://pubmed.ncbi.nlm.nih.gov/33461593/)]. [PubMed Central: [PMC7812564](https://pubmed.ncbi.nlm.nih.gov/PMC7812564/)].
- Di Mascio D, Khalil A, Saccone G, Rizzo G, Buca D, Liberati M, et al. Outcome of coronavirus spectrum infections (SARS, MERS, COVID-19) during pregnancy: A systematic review and meta-analysis. *Am J Obstet Gynecol MFM.* 2020;**2**(2):100107. doi: [10.1016/j.ajogmf.2020.100107](https://doi.org/10.1016/j.ajogmf.2020.100107). [PubMed: [32292902](https://pubmed.ncbi.nlm.nih.gov/32292902/)]. [PubMed Central: [PMC7104131](https://pubmed.ncbi.nlm.nih.gov/PMC7104131/)].
- Lucas DN, Bamber JH. Pandemics and maternal health: The indirect effects of COVID-19. *Anaesthesia.* 2021;**76** Suppl 4:69–75. doi: [10.1111/anae.15408](https://doi.org/10.1111/anae.15408). [PubMed: [33682091](https://pubmed.ncbi.nlm.nih.gov/33682091/)]. [PubMed Central: [PMC8251236](https://pubmed.ncbi.nlm.nih.gov/PMC8251236/)].
- Villar J, Ariff S, Gunier RB, Thiruvengadam R, Rauch S, Kholin A, et al. Maternal and neonatal morbidity and mortality among pregnant women with and without COVID-19 infection: The intercovid multinational Cohort study. *JAMA Pediatr.* 2021;**175**(8):817–26. doi: [10.1001/jamapediatrics.2021.1050](https://doi.org/10.1001/jamapediatrics.2021.1050). [PubMed: [33885740](https://pubmed.ncbi.nlm.nih.gov/33885740/)]. [PubMed Central: [PMC8063132](https://pubmed.ncbi.nlm.nih.gov/PMC8063132/)].
- Yassa M, Birol P, Yirmibes C, Usta C, Haydar A, Yassa A, et al. Near-term pregnant women's attitude toward, concern about and knowledge of the COVID-19 pandemic. *J Matern Fetal Neonatal Med.* 2020;**33**(22):3827–34. doi: [10.1080/14767058.2020.1763947](https://doi.org/10.1080/14767058.2020.1763947). [PubMed: [32429780](https://pubmed.ncbi.nlm.nih.gov/32429780/)].
- Royal College of Obstetricians Gynaecologists. Coronavirus (COVID-19) infection in pregnancy. *Information for healthcare professionals.* 2020;Version 4.
- Paz-Pascual C, Artieta-Pinedo I, Grandes G, ema Q. Consensus on priorities in maternal education: Results of Delphi and nominal group technique approaches. *BMC Pregnancy Childbirth.* 2019;**19**(1):264. doi:

- [10.1186/s12884-019-2382-8](#). [PubMed: [31340770](#)]. [PubMed Central: [PMC6657030](#)].
11. Sangrà A, Vlachopoulos D, Cabrera N. Building an inclusive definition of e-learning: An approach to the conceptual framework. *Int Rev Res Open Distance Learn*. 2012;**13**(2):145. doi: [10.19173/irrodl.v13i2.1161](#).
  12. Gasch M, Dunleavy GJ, Kyaw BM, Lean MEJ, Nikolaou CK. Personalized health, eLearning, and mHealth interventions to improve nutritional status. *Curr Nutr Rep*. 2016;**5**(4):295–306. doi: [10.1007/s13668-016-0184-4](#).
  13. Garcia-Gomez JM, de la Torre-Diez I, Vicente J, Robles M, Lopez-Coronado M, Rodrigues JJ. Analysis of mobile health applications for a broad spectrum of consumers: A user experience approach. *Health Informatics J*. 2014;**20**(1):74–84. doi: [10.1177/1460458213479598](#). [PubMed: [24550566](#)].
  14. Guerra-Reyes L, Christie VM, Prabhakar A, Harris AL, Siek KA. Postpartum health information seeking using mobile phones: Experiences of low-income mothers. *Matern Child Health J*. 2016;**20**(Suppl 1):13–21. doi: [10.1007/s10995-016-2185-8](#). [PubMed: [27639571](#)]. [PubMed Central: [PMC5118389](#)].
  15. Chan KL, Chen M. Effects of social media and mobile health apps on pregnancy care: Meta-analysis. *JMIR Mhealth Uhealth*. 2019;**7**(1). e11836. doi: [10.2196/11836](#). [PubMed: [30698533](#)]. [PubMed Central: [PMC6372934](#)].
  16. Chae JM, Kim HK. Internet-based prenatal interventions for maternal health among pregnant women: A systematic review and meta-analysis. *Child Youth Serv Rev*. 2021;**127**:106079. doi: [10.1016/j.childyouth.2021.106079](#).
  17. Qian J, Wu T, Lv M, Fang Z, Chen M, Zeng Z, et al. The value of mobile health in improving breastfeeding outcomes among perinatal or postpartum women: Systematic review and meta-analysis of randomized controlled trials. *JMIR Mhealth Uhealth*. 2021;**9**(7). e26098. doi: [10.2196/26098](#). [PubMed: [34269681](#)]. [PubMed Central: [PMC8325083](#)].
  18. Hui A, Philips-Beck W, Campbell R, Sinclair S, Kuzdak C, Courchene E, et al. Impact of remote prenatal education on program participation and breastfeeding of women in rural and remote Indigenous communities. *EClinicalMedicine*. 2021;**35**:100851. doi: [10.1016/j.eclinm.2021.100851](#). [PubMed: [33997743](#)]. [PubMed Central: [PMC8099658](#)].
  19. Grusso P, Quatraro RM, Jorizzo GJ. Supporting perinatal women in the context of the COVID-19 emergency: Can web-based antenatal education classes make it possible? *J Reprod Infant Psychol*. 2020;**38**(5):471–3. doi: [10.1080/02646838.2020.1834261](#). [PubMed: [33073593](#)].
  20. Moulaei K, Sheikhtaheri A, Ghafaripour Z, Bahaadinbeigy K. The development and usability assessment of an mHealth application to encourage self-care in pregnant women against COVID-19. *J Healthc Eng*. 2021;**2021**:9968451. doi: [10.1155/2021/9968451](#). [PubMed: [34336175](#)]. [PubMed Central: [PMC8292075](#)].