

Effect of Online Antenatal Educational Sessions during COVID-19 Pandemic on Pandemic-Related Pregnancy Stress

Dina Mohamed Abuelkheir 1, Amina Mohamed Rashad El-Nemer 2

1 Assistant lecturer of Woman's Health & Midwifery Nursing, Faculty of Nursing, Mansoura University, Egypt.

2 Prof of Woman's Health and Midwifery Nursing, Faculty of Nursing, Mansoura University, Egypt.

*Corresponding author email: denamohamed386@yahoo.com



1. ABSTRACT

Pandemic-related pregnancy stress is a particular form of pregnancy stress that is related to feeling unprepared for labor due to the pandemic as well as fear of COVID-19 infection. **Aim:** The study aimed to evaluate the effect of online antenatal educational sessions during COVID-19 pandemic on pandemic-related pregnancy stress. **Sample:** A purposive sample of one hundred pregnant women who attended antenatal care at antenatal clinics of the Department of Obstetrics and Gynecology at Mansoura University Hospitals, Mansoura city. **Design:** A quasi-experimental research design was utilized. **Tools:** Two tools were used to collect data; A structured interview schedule was utilized to assess the demographic and obstetric characteristics of the studied pregnant women and the Pandemic-Related Pregnancy Stress scale was utilized to measure stress related to COVID-19 pandemic among the pregnant women participated in the study. **Results:** The current study results indicate that post-intervention pandemic-related pregnancy stress was statistically highly significantly lower in the intervention group than in the control group ($P < 0.001$). **Conclusion:** Online antenatal educational sessions during COVID-19 pandemic appeared to be a powerful tool to reduce pregnant women's pandemic-related pregnancy stress. **Recommendations:** Applying an online educational program for pregnant women which is a new useful tool for providing antenatal health education for Egyptian women from now on.

Keywords: COVID-19, Online education, Pandemic-Related pregnancy stress

2. Introduction:

Coronavirus disease 2019 (COVID-19) is a newly detected respiratory illness that caused by the coronavirus that was discovered in Wuhan, China in December 2019, spread to many other countries, and was declared a global pandemic by World Health Organization (WHO) in March 2020 (WHO, 2022). COVID-19 is characterized by rapid transmission through respiratory droplets produced by coughing, sneezing, or speaking, handshake, and feco-oral contact with an incubation period of two to fourteen days (Rothan & Byrareddy, 2020).

A considerable increase in maternal and neonatal problems, such as miscarriage, preeclampsia, preterm birth, altered fetal wellbeing, and intrauterine growth restriction, have been linked to COVID-19 during pregnancy (Musa, 2020). Additionally, compared to non-pregnant women, pregnant women diagnosed with COVID-19 were more likely to need intensive care and had a higher risk of maternal mortality (Moselhy & Attia, 2021).

Besides; its physical impacts on pregnant women, COVID-19 pandemic has been shown to have negative psychological effects and cause significant levels of stress (Campos-Garzón, Riquelme-Gallego, de la Torre-Luque & Caparrós-González, 2021). Pregnant women experience

stress during COVID-19 pandemic because of lack of information about the virus, social distance, health risks for themselves and their fetuses, access to antenatal care, the possibility of contracting the disease during antenatal follow-up, and policies that limit the presence of husband during labor (Matvienko-Sikar, Meedy & Ravaldi, 2020).

Moreover, WHO's adjustments to the antenatal care schedule during COVID-19 pandemic which limited the frequency of face-to-face visits and also limited the time of visit, make it difficult to provide antenatal education in health care facilities and contribute to prenatal stress (Larki, Sharifi & Roudsari, 2020).

In response to these modifications, maternity nurses should provide options for providing prenatal care including antenatal education, to support pregnant women, reduce prenatal stress, and guarantee the best possible health for both the mothers and the fetus (Ziougou & Zografou, 2020). Online education is a great choice during the pandemic. It is a sort of telemedicine that enables healthcare professionals to give patients and pregnant women health-related information and counseling to improve their physical and mental well-being (Sharmila, Babu &

Balakrishnan, 2020); (*Preis, Mahaffey, Heiselman & Lobel, 2020*) a.

Significance of the study

Due to the rapid spread of COVID-19 and the increased number of affected and dying cases; pregnancy related stress has increased. According to a systematic review conducted to evaluate how the COVID-19 pandemic affected the prevalence of stress, anxiety and depression among pregnant women found that stress was the most prevalent mental health problem among the studied women (*Demissie & Bitew, 2021*). Similarly; the results of a comparative study carried out in Kafrelsheikh governorate, Egypt, showed that pregnant women were more stressed than non-pregnant women during the COVID-19 pandemic (*Ahmed, Mostafa & Dwedat, 2020*).

High-stress levels in pregnancy period may result in elevated blood pressure, and heart problems, or exacerbate any pre-existing chronic diseases, as well as raise the risk of maternal anxiety and postpartum depression (*Chen, 2017*). Additionally, it is linked to many obstetric problems like poor fetal growth, preterm labor, protracted labor, and a high cesarean section rate (*Rathbone & Prescott, 2019*). Maternal stress could be reduced by involving pregnant women in educational programs and providing information about COVID-19 to maintain the well-being of the mother and developing fetus during pregnancy, labor, delivery, and postpartum (*Preis et al., 2020*).

At the time of COVID-19; most of life became online such as shopping, visiting doctors, exercising, communicating with families, working and even educating became from home. As well, WHO recommends using available technologies to support remote care for pregnant women and prevent COVID-19 transmission (*Gülmezoglu et al., 2020; Larkiet et al., 2020*). Online education was a good alternative for pregnant women who need essential prenatal care and medical advice during COVID-19 pandemic. However, we were not sure if Egyptian pregnant women are ready for such an innovation in online service delivery. So, this study was important to introduce the online education program and to investigate the effect of online antenatal educational sessions at the time of COVID-19 pandemic on pregnancy stress related to the pandemic.

2.1 Aim of the study:

The study aimed to evaluate the effect of online antenatal educational sessions during COVID-19 pandemic on pandemic-related pregnancy stress.

2.2 Research hypothesis:

To achieve the study aim, the following research hypothesis was formulated:

Pregnant women who will receive online antenatal educational sessions will have low pandemic-related pregnancy stress than pregnant women who won't receive.

3. Method

3.1 Research design:

To fulfil the aim of this study, a quasi-experimental research design was used.

3.2 Study Setting:

This study was partially conducted at the antenatal clinics of the Department of Obstetrics & Gynecology at Mansoura University Hospital, Mansoura city. The participants were only chosen from the previously mentioned place but the online sessions were prepared and installed at a web site (<https://thehealthgardens.com>) for women to use from their own homes.

3.3 Sampling

A purposive sample of one hundred pregnant women who attended antenatal follow-up at the mentioned setting was chosen based on the following criteria.

Inclusion criteria

1. Educated pregnant women who are in the first trimester.
2. Pregnant women who can use computer or smart phone.

Exclusion criteria

1. Pregnant women with a psychiatric illness.
2. Pregnant women with COVID-19.

Sample size:

According to data from (*Aksoy Derya et al., 2021*), the sample size required for the study is one hundred, considering the 5% significance level and the power of the study of 80%.

3.4 Tools of data collection:

Two tools were utilized to collect data to fulfill the purpose of this study.

Tool one: A structured Interviewing Schedule.

This tool was developed by the researcher after reviewing the relevant literature (*Aksoy Derya et al., 2021; IIska, Kolodziej-Zaleska, Brandt-Salmeri, Preis & Lobel, 2021*). It consists of three parts:

Part (1): Socio-demographic characteristics of the pregnant women participated in the study: such as age, educational level, husband's

education, occupation, place of residence, monthly income, presence of chronic physical disease, and presence of husband support.

Part (2): Obstetric characteristics of the pregnant women participated in the study: such as number of pregnancies, number of deliveries, planned pregnancy, method of current conception, and the number of living children.

Part (3): Previous pregnancy outcomes of the studied pregnant women: such as abortion, preterm labor, low birth weight, and neonatal death.

Tool two: The Pandemic-Related Pregnancy Stress Scale (PREPS)

This tool was adapted from (Preis, Mahaffey & Lobel, 2020). The PREPS is a newly developed tool to measure the prenatal stress at the time of the pandemic. It is a five-point Likert scale that range from 1 = very little to 5 = very much, contains fifteen items and divided into three sub scales.

The first subscale is (PREPS-Preparedness) which assesses stress related to childbirth preparation due to the pandemic and includes seven items.

The second subscale is (PREPS-Infection) which assesses stress related to perinatal infection with COVID- 19 and includes five items.

The third subscale is (Positive Appraisal) which assesses the benefits of pregnancy at the time of the pandemic and includes three items. This domain was not relevant to this study and was not used.

Scoring system

Scores are estimated as mean item response for each sub scale. Each subscale has a range of values from one to five, with higher values means higher stress levels. Dichotomization was performed using a cutoff value of 4 or higher (< 4 means low level of stress; ≥ 4 means high level of stress (Preis, Mahaffey, Heiselman& Lobel, 2020) b.

3.5 Validity and Reliability of the study tools

The study instruments were evaluated for content validity by three specialists in the field of midwifery nursing and two nursing specialists in the field of mental health and the essential modifications were performed and were checked for reliability by using the Cronbach coefficient alpha test. The preparedness stress domain shows internal consistency with Cronbach's alpha equal to 0.831 and the infection stress domain shows internal consistency with Cronbach's alpha equal to 0.825.

3.6 Pilot study

The pilot study was conducted on ten pregnant women in the same setting and not included in the study. The pilot study was carried out to assess the suitability of the data collection tools and reveal any problems in data collection.

3.7 Ethical considerations

Ethical permission was obtained from the Research Ethics Committee of the Faculty of Nursing, Mansoura University then official approval to conduct the study was obtained from the head of antenatal clinics at Mansoura University Hospital, and written consent was obtained from participant women after explaining the purpose of the study to them. In addition, the participant women were assured that taking part in this study is voluntary and that all gathered data will be treated in a private way and will be used only for achieving the purpose of the study. Moreover, all participated pregnant women have the right to leave the study without giving any reason.

3.8 Statistical analysis

The SPSS version 21 was used for the statistical analysis. Additionally, variables with categorical data were compared using the Chi-square test. All continuous variables had normal distributions and were represented in mean and standard deviation (SD).

4. Results

Table 1 demonstrates that there were no statistically significant variations in the demographic characteristics of the studied pregnant women in the two groups ($p > 0.05$). The average age of the participated pregnant women in the intervention and control groups were (23.8 \pm 6.5 and 25.2 \pm 7.2 respectively). Regarding the educational level of the participated pregnant women, it is obvious that (50% & 58% respectively) of the intervention and control groups had higher education. Concerning occupation, it is clear that (70% & 60 % respectively) of the intervention and control groups were housewives. Concerning the monthly income, 70 % & 72 % respectively of the studied pregnant women in the intervention and control groups had less than 4.000 pounds/ month. In addition, 56 % & 54 % respectively of the studied pregnant women in the intervention and control groups were from rural areas.

Table 2 shows that there were no statistically significant variations in the reproductive characteristics of the studied pregnant women in the two groups ($P > 0.05$). The mean

gravidity of them was (2.5 ± 1.6 & 2.1 ± 1.3 respectively) in the intervention and control groups. The mean parity was (1.6 ± 1.0 & 1.7 ± 1.6 respectively) in the intervention and control groups. The average number of living children was (1.8 ± 1.0 & 2.0 ± 1.6 respectively) in the intervention and control groups. In addition, 88% & 84% respectively of the studied pregnant women in the intervention and control groups had planned pregnancies. Moreover, 92% & 94% respectively of the intervention and control groups had natural conception.

Table 3 illustrates that there were no statistically significant variations in the previous pregnancy outcomes of the studied pregnant women among the two groups ($P > 0.05$). It is obvious that (50 % and 56.3 % respectively) of multigravida women in the control and intervention groups had a previous abortion. In addition, 25.9 % & 12 % respectively of them in the intervention and control groups had previous preterm labor. Furthermore, 29.6 % & 16.0 % respectively of multigravida women in the intervention and control group had previous low birth weight babies.

Figure 1 shows that the high preparedness stress level decreased from 52% pre- intervention to 20 % post-intervention for the intervention group while high-stress level increased from 38% pre-intervention to 58% post-intervention for the control group with highly statistically significant variations between the two groups ($P < 0.001$).

Figure 2 shows that high infection stress levels decreased from 70% pre- intervention to 30 % post-intervention for the intervention group while high-stress levels decreased from 74% pre-intervention to 72% post-intervention for the control group with highly statistically significant variations between the two groups ($P < 0.001$).

5. Discussion

The current study aimed to evaluate the effect of online antenatal educational sessions during COVID-19 pandemic on pandemic-related pregnancy stress. The study hypothesis was supported by the study findings as there was a statistically highly significant variation in the pandemic-related pregnancy stress between both groups.

Pandemic-related pregnancy stress is a particular type of stress that focuses on two main concerns; the first is preparedness stress, which refers to feeling unprepared for childbirth and the postpartum period due to pandemic-related restrictions. The second is perinatal infection stress, which includes concerns about COVID-19

infection for the mother, fetus, and newborn. The present study revealed that there is no statistically significant variation in the preparedness stress score and infection stress score of the pregnant women in the study groups at pre-intervention. These results suggest that the pregnant women in both groups had nearly the same levels of pregnancy stress related to COVID-19 pandemic before the online education.

The preparedness stress score and infection stress score of the studied women in the intervention group reduced significantly after receiving the online antenatal educational sessions compared to the control group ($P < 0.001$). This could be because the post- intervention data collection was done during the fourth wave of COVID-19 and the control group didn't receive any information or health education during antenatal care.

The current study findings are supported by *Potharst et al., (2022)* who examined the impact of implementing an online health education for pregnant women feeling stress from the COVID-19 pandemic and reported that, those who followed the online intervention experienced significantly lower levels of depressive symptoms and worries. In the same line *Nosratabadi, Masoudiyekta, Majidipour & Sarabi (2022)* who conducted a quasi-experimental study to investigate the impact of providing virtual health education to pregnant women on the fear related to COVID-19 pandemic, found that virtual health education reduces the fear related to COVID-19 pandemic among pregnant women.

Another study by *Hashemzahi, Khayat & Khazayan (2021)* on the impact of remote COVID-19 self-care training on COVID-19 related stress and anxiety among pregnant women reported that there was a significant variation in the stress scores between the intervention and control groups. Additionally, *DoğanMerih, Karabulut & Sezer (2021)* conducted a study to evaluate the impact of online training during pregnancy on lowering pregnant women's and their husbands' anxiety during COVID-19 pandemic and reported that the level of anxiety is reduced as a result of the online education with a significant difference between the studied pregnant women's pre- and post-training anxiety scores.

Another supporting study by *Tsai, Hsu, Hou & Chang (2018)* to evaluate the effectiveness of web-based prenatal care and education on pregnancy-related stress, overall self-efficacy, and satisfaction with prenatal care found that women in the intervention group had less pregnancy-related

stress and higher levels of overall reported self-efficacy following the intervention compared to the control group. They also expressed significantly higher levels of satisfaction with prenatal care than the control group.

Moreover, *AksoyDerya, Altiparmak, Akça, Gökbulut, & Yilmaz (2021)* conducted a quasi-experimental study to evaluate the effects of online education on prenatal distress and pregnancy anxiety among pregnant women at the time of COVID-19 pandemic, found that the tele-education decreased the prenatal distress and pregnancy anxiety among pregnant women.

Furthermore, a quasi-experimental study done by *Murbiah, Bustam&Garmini (2022)* to evaluate the impact of health education using social media on anxiety levels among pregnant women at the time of COVID-19 revealed that health education via social media was effective in lowering anxiety levels among pregnant women during the pandemic. Also, the current study findings could be supported by *Uludağ, Serçekus, Vardar, Özkan& Alatas (2022)* who conducted a study to assess the impacts of online prenatal education on labor worries, childbirth anxiety, readiness for childbirth, and fear of COVID-19 among pregnant women during the pandemic and concluded that online prenatal education is effective in reducing COVID-19 fear and improving readiness for labor.

6. Conclusion

Online antenatal educational sessions during COVID-19 pandemic appeared to be a useful tool in reducing pregnant women's stress levels associated to feeling unprepared for labor and stress related to perinatal infection.

7. Recommendations

In the light of the study' findings, the following recommendation is suggested:

Applying an online educational program for pregnant women which is a new useful tool for providing antenatal health education for Egyptian women from now on.

8. Acknowledgments

The authors would like to offer their appreciation to pregnant women who voluntarily took part in the study.

9. Conflict of Interests

Regarding this study, there is no conflict of interest.

10. References

- Ahmed, A., Mostafa, N. & Dwedar, L. (2020):** Psychological distress associated with COVID-19 pandemic among pregnant women: A comparative study. *Egyptian Journal of Health Care*, 11(4), 645 :656. DOI: 10.21608/ejhc.2020.170295
- AksoyDerya, Y., Altiparmak, S., Akça, E., Gökbulut, N., & Yilmaz, A. N. (2021).** Pregnancy and birth planning during COVID-19: The effects of tele-education offered to pregnant women on prenatal distress and pregnancy-related anxiety. *Midwifery*, 92, 102877.
- Campos-Garzón, C., Riquelme-Gallego, B., de la Torre-Luque, A., & Caparrós-González, R. A. (2021).** Psychological Impact of the COVID-19 Pandemic on Pregnant Women: A Scoping Review. *Behavioral sciences* (Basel, Switzerland), 11(12), 181. <https://doi.org/10.3390/bs11120181>
- Chen, Ch. (2017).** Pregnancy anxiety. *Psychology for pregnancy*. (1sted). Brain & Life Publishing. London. P 95.
- Demissie, D., & Bitew, Z. (2021).** Mental health effect of COVID-19 pandemic among women who are pregnant and/or lactating: A systematic review and meta-analysis. *SAGE open medicine*, 9, 20503121211026195. <https://doi.org/10.1177/20503121211026195>
- DoğanMerih, Y., Karabulut, Ö., Sezer, A. (2021).** Is Online Pregnant School Training Effective in Reducing the Anxiety of Pregnant Women and Their Partners During the COVID-19 Pandemic? *Bezmialem Science* ;9(Supplement 1):13-24. DOI: 10.14235/bas.galenos.2020.4718
- Gülmezoglu, A. M., Ammerdorffer, A., Narasimhan, M., Wilson, A. N., Vogel, J. P., Say, L., & Tunçalp, Ö. (2020).** Self-care and remote care during pregnancy: a new paradigm? *Health research policy and systems*, 18(1), 107. <https://doi.org/10.1186/s12961-020-00627-4>
- Hashemzahi, M., Khayat, S. & Khazayan, S. (2022).** Effect of COVID-19 Self-care Training via Telemedicine on Perceived Stress and Corona Disease Anxiety in Pregnant Women: A Quasi-Experimental Study. *Journal of Midwifery and Reproductive Health*, 10(1), 3066-3074. DOI: 10.22038/jmrh.2021.60589.1728

- Ilska, M., Kołodziej-Zaleska, A., Brandt-Salmeri, A., Preis, H., & Lobel, M. (2021). Pandemic Stress and Its Correlates among Pregnant Women during the Second Wave of COVID-19 in Poland. *International journal of environmental research and public health*, 18(21), 11140. <https://doi.org/10.3390/ijerph182111140>
- Larki, M., Sharifi, F. & Roudsari, R.L. (2020). Models of maternity care for pregnant women during the COVID-19 pandemic. *East Mediterr Health J*, 26(9), 994-998. <https://doi.org/10.26719/emhj.20.097>
- Matvienko-Sikar, k., Meedya, Sh. & Ravaldi, C. (2020). Perinatal mental health during the COVID-19 pandemic. *Women and birth: journal of the Australian College of Midwives*, 33(4), 309-310. <https://doi.org/10.1016/j.wombi.2020.04.006>
- Moselhy, M. & Attia, Z. (2021). Knowledge, Attitude, and preventive practices toward current pandemic COVID-19 among pregnant women. *Egyptian journal of nursing & health science*, 2(2), 176 –203. DOI: [10.21608/EJNHS.2021.196026](https://doi.org/10.21608/EJNHS.2021.196026).
- Murbiah, Bustam, I. & Garmini, R. (2022): Effect of Health Education Through Social Media at the Level of Anxiety Pregnant Women in the Time of Covid-19. *Mal J Med Health Sci*, 18(SUPP2): 88-91.
- Musa, I. (2020). Risk Factors Contributing in Increased Susceptibility and Severity of COVID-19 Infection during Pregnancy. *Open Journal of Obstetrics and Gynecology*, 10, 1197-1215. DOI: [10.4236/ojog.2020.1090113](https://doi.org/10.4236/ojog.2020.1090113)
- Nosratabadi, M., Masoudiyekta, L., Majidipour, N., & Sarabi, N. (2022). The Effect of Virtual Education on Fear Caused by COVID-19 Pandemic in Pregnant Women: A Quasi-Experimental Study. *Journal of Midwifery and Reproductive Health*, 10(2), 3248-3257. DOI: [10.22038/JMRH.2022.62694.1784](https://doi.org/10.22038/JMRH.2022.62694.1784)
- Potharst, E. S., Schaeffer, M. A., Gunning, C., de Lara, M. C., Boekhorst, M., Hulsbosch, L. P., Pop, V., & Duijff, S. N. (2022). Implementing "Online Communities" for pregnant women in times of COVID-19 for the promotion of maternal well-being and mother-to-infant bonding: a pretest-posttest study. *BMC pregnancy and childbirth*, 22(1), 415. <https://doi.org/10.1186/s12884-022-04729-5>
- Preis, H., Mahaffey, B., & Lobel, M. (2020). Psychometric properties of the Pandemic-Related Pregnancy Stress Scale (PREPS). *Journal of psychosomatic obstetrics and gynaecology*, 41(3), 191–197. <https://doi.org/10.1080/0167482X.2020.1801625>
- Preis, H., Mahaffey, B., Heiselman, C., & Lobel, M. (2020) a. Pandemic-related pregnancy stress and anxiety among women pregnant during the COVID-19 pandemic. *Am J Obstet Gynecol MFM*, 2:100155. <https://doi.org/10.1016/j.ajogmf.2020.100155>
- Preis, H., Mahaffey, B., Heiselman, C., & Lobel, M. (2020) b. Vulnerability and resilience to pandemic-related stress among U.S. women pregnant at the start of the COVID-19 pandemic. *Social science & medicine* (1982), 266, 113348. <https://doi.org/10.1016/j.socscimed.2020.113348>
- Rathbone, A. & Prescott, J. (2019). Pregnancy-specific health anxiety: Symptom or diagnosis? *British Journal of Midwifery*, 27(5), 288–93. <https://doi.org/10.12968/bjom.2019.27.5.288>
- Rothan, H. & Byrareddy, S. (2020). The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. *J Autoimm*, 109, 1024-33. <https://doi.org/10.1016/j.jaut.2020.102433>
- Sharmila, V., Babu, Th. & Balakrishnan, P. (2020). Optimizing telemedicine for providing obstetric and reproductive health care services during COVID-19 pandemic. *International Journal of Community Medicine and Public Health*, 7(8), 3278. <https://dx.doi.org/10.18203/2394-6040.ijcmph20203414>
- Tsai, Y., Hsu, Y., Hou, T., & Chang, C. (2018). Effects of a Web - Based Antenatal Care System on Maternal Stress and Self - Efficacy During Pregnancy: A Study in Taiwan. *Journal of Midwifery and Women'S Health*, 63, 205–213. <https://doi.org/10.1111/jmwh.12685>
- Uludag, F., Serçekus, P., Vardar, O., Özkana, S. & Alatas, S. (2022). Effects of online antenatal education on worries about labour, fear of childbirth, preparedness for labour and fear of covid-19 during the covid-19 pandemic: A single-blind randomized

controlled study. *Midwifery* 115, 103484.
<https://doi.org/10.1016/j.midw.2022.103484>

WHO (2022): Coronavirus disease (COVID-19) pandemic. Available at

Ziogou, R., Zografou, K. (2020). Homebirth and homecare during COVID-19. *European Journal of Midwifery*,4, 14. <https://doi.org/10.18332/ejm/120972>.

Table (1): Demographic characteristics of the studied pregnant women in the intervention and control groups (N= 100)

Demographic characteristics	Control (n=50)		Intervention(n=50)		Chi-Square	
	NO.	%	NO.	%	X ²	P
Age (years)						
15 – <25	25	50.0	29	58.0		
25 – <35	20	40.0	18	36.0		
35 – 45	5	10.0	3	6.0	0.902	0.636
Mean ±SD	25.2 ±7.2		23.8 ±6.5		1.019	0.311
Women’s education						
Basic education	4	8.0	4	8.0		
Secondary education	17	34.0	21	42.0		
High education	29	58.0	25	50.0	0.717	0.699
Husband’s education						
Can't read or write	3	6.0	3	6.0		
Read and write	4	8.0	3	6.0		
Basic education	3	6.0	5	10.0		
Secondary education	15	30.0	20	40.0		
High education	25	50.0	19	38.0	2.175	0.703
Occupation						
Housewife	30	60.0	35	70.0		
Employee	16	32.0	13	26.0		
Student	4	8.0	2	4.0	1.362	0.506
Income/ Month (Pounds)						
< 4.000	36	72.0	35	70.0		
4.000- < 6.000	12	24.0	11	22.0		
6.000 – 10.000	2	4.0	4	8.0	0.724	0.696
Residence						
Urban	23	46.0	22	44.0		
Rural	27	54.0	28	56.0	0.040	0.841
Presence of chronic physical disease						
No	45	90.0	43	86.0		
Yes	5	10.0	7	14.0	0.379	0.538
Presence of the husband’s support						
No	8	16.0	12	24.0		
Yes	42	84.0	38	76.0	1.000	0.317

Table (2): Reproductive characteristics of the studied pregnant women in the intervention and control groups (N = 100)

Reproductive characteristics	Control		Intervention		Chi-Square	
	NO.	%	NO.	%	X ²	P

Gravidity	(n=50)		(n=50)			
Primigravida	20	40.0	18	36.0		
Twice	16	32.0	13	26.0		
Three times or more	14	28.0	19	38.0	1.173	0.556
Mean±SD	2.1 ±1.3		2.5 ±1.6		1.211	0.229
Planned pregnancy	(n=50)		(n=50)			
No	8	16.0	6	12.0		
yes	42	84.0	44	88.0	0.332	0.564
Mode of the current conception	(n=50)		(n=50)			
Natural	47	94.0	46	92.0		
With fertility treatment	3	6.0	4	8.0	0.154	0.694
Parity	(n=30)		(n=32)			
Nulliparous	5	16.7	5	15.6		
Once	13	43.3	9	28.1		
Twice or more	12	40.0	18	56.3	1.865	0.393
Mean±SD	1.7 ±1.6		1.6 ±1.0		0.308	0.759
Number of living children	(n=25)		(n=27)			
One child	14	56.0	12	44.4		
Two children	6	24.0	11	40.7		
Three children or more	5	20.0	4	14.8	1.661	0.436
Mean±SD	2.0 ±1.6		1.8 ±1.0		0.614	0.542

Table (3): Previous pregnancy outcomes of the studied pregnant women in the intervention and control groups (N = 100)

Previous pregnancy outcomes	Control		Intervention		Chi-Square	
	NO.	%	NO.	%	X ²	P
Abortion	(n=30)		(n=32)			
None	15	50.0	14	43.8		
Yes	15	50.0	18	56.3	0.243	0.622
Preterm Labor	(n=25)		(n=27)			
None	22	88.0	20	74.1		
Yes	3	12.0	7	25.9	1.621	0.203
Low Birth Weight	(n=25)		(n=27)			
None	21	84.0	19	70.4		
Yes	4	16.0	8	29.6	1.358	0.244
Neonatal Death	(n=25)		(n=27)			
None	22	88.0	24	88.9		
Yes	3	12.0	3	11.1	0.01	0.920

Effect of Online Antenatal Educational Sessions

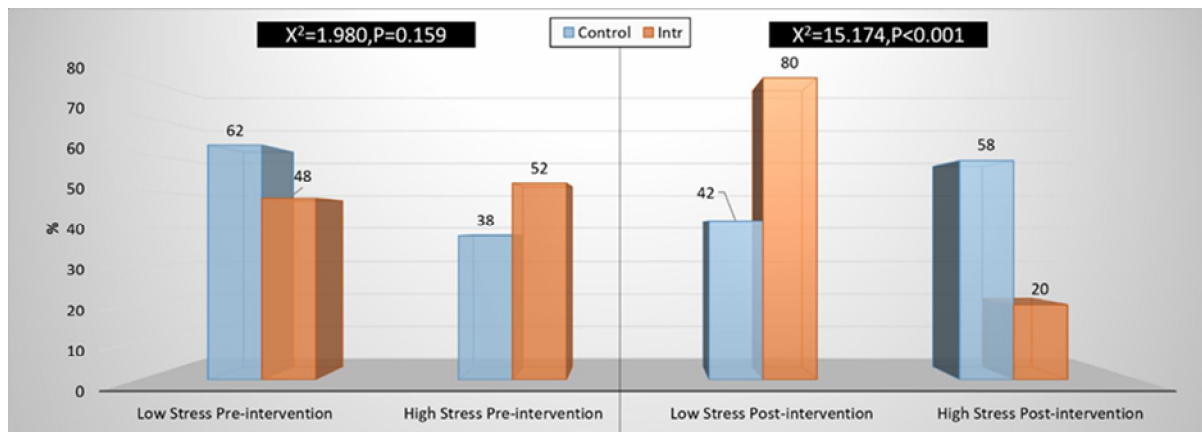


Figure (1). Comparison of preparedness stress scores among groups at pre & post-intervention

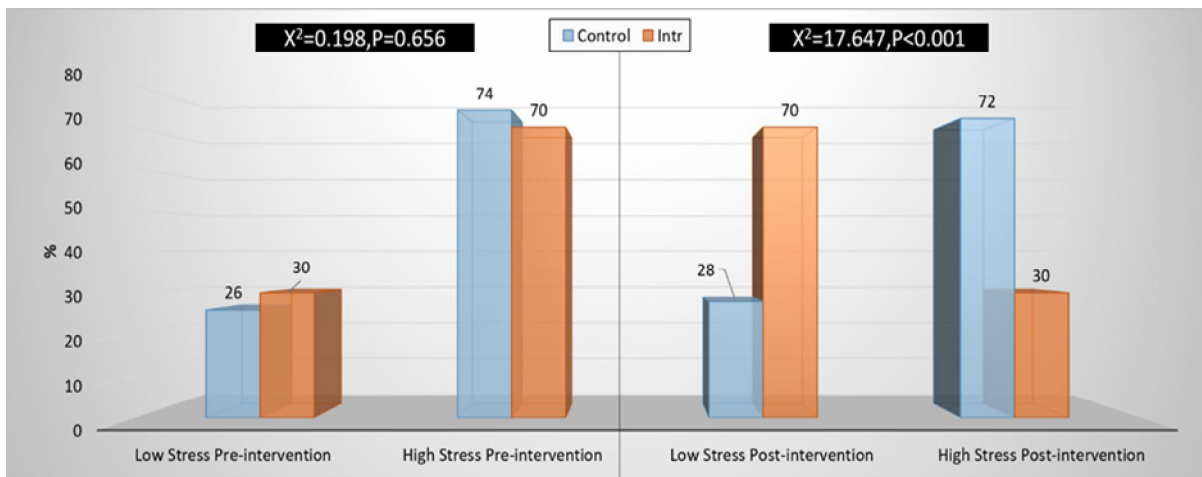


Figure (2). Comparison of infection stress scores among groups at pre & post-intervention