

# Anxiety Following The COVID-19 Vaccination Program among Pregnant Women Attending Antenatal Clinics at a Tertiary Care Centre in Southern Province, Sri Lanka

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**Abstract.** The COVID-19 pandemic had a significant impact on the mental health of the pregnant population. Increased antenatal anxiety levels were observed globally due to the pandemic itself and the introduction of novel vaccinations. The study attempted to assess antenatal anxiety and risk factors related to COVID-19 anxiety, after the initiation of the vaccination campaign for COVID-19 in Sri Lanka. A descriptive cross-sectional study was conducted among pregnant women attending antenatal clinics in Teaching Hospital Mahamodara, sixteen months after the vaccination campaign. Anxiety levels were screened with the validated Sinhala version of the Perinatal Anxiety Screening Scale (PASS-S) and associated risk factors were explored. Clinical antenatal anxiety was detected among 17.9%, similar to anxiety levels present during the pandemic in Sri Lanka (17.5% vs 17.9%). A majority (63.4%), were asymptomatic, 33.5% had mild to moderate anxiety and 3.1% had severe anxiety. Maternal age, parity, gestation, presence of complications, education, income, employment, or a COVID-19-infected family member were not associated with antenatal anxiety. Nor did the vaccination status of the pregnant women or their spouses, demonstrate an association with anxiety. Newspapers and television were the sources accessed by a majority to gain information and 36.6% were concerned about the health effects on the fetus. Antenatal anxiety remained unchanged post the initiation of the COVID-19 vaccination program in Sri Lanka. Antenatal anxiety did not demonstrate a significant association with sociodemographic or obstetric factors and the COVID-19 vaccination status.

**Keywords.** Antenatal anxiety, COVID-19, vaccination, PASS-S

## INTRODUCTION

COVID-19 in pregnancy is associated with adverse outcomes in both pregnant women and neonates. These include intrauterine growth restriction, miscarriages, preterm delivery, disseminated intravascular coagulation, and a higher number of intensive care admissions. It has been discovered that pregnant mothers are more susceptible than the general population to contracting COVID-19 and developing severe pneumonia, especially when they have antenatal complications or suffer from chronic diseases (1). The psychological impact of COVID-19 was immense, causing emotional distress such as stress, irritability, fear, confusion, boredom, insomnia, and depression. Stressors that lead to adverse psychological states include the death of family or friends, fear after exposure to infected individuals, infection of

loved ones, financial losses, and social distancing for long periods (2).

Studies conducted globally reported that pregnant women have higher anxiety levels during the COVID-19 pandemic ranging from 88% to 17% (3–6). The result is an 88.8% increase in anxiety due to the pandemic. Pregnant women with a higher education level and income were found to have more anxiety levels caused by the pandemic (7).

Studies conducted in Sri Lanka reported antenatal anxiety to be 17.5% in early 2020, and 17% during the second wave in late 2020 (5,8).

A predominant concern of pregnant women was the fear of getting infected with COVID-19. However, factors related to pregnancy, such as having to stop physical prenatal visits, changing birth plans, possible adverse outcomes for the fetus, and socioeconomic factors such as fear of food scarcity, conflicts

at home, and family members being essential workers or residing in highly infected areas of COVID-19 were also influential factors increasing antenatal anxiety (3,4,6,8,9). Visiting public places, travelling by public transport, previous diagnoses of anxiety or depression, and social restrictions were amplifiers for antenatal anxiety (6,8).

The result was significantly higher antenatal anxiety in comparison to anxiety during the pre-pandemic period (3). Thus, the importance of providing pregnant women with information regarding safety measures and coping anxiety levels was identified (9).

The World Health Organization (WHO), issued interim recommendations on COVID-19 vaccination of pregnant and lactating women in June 2021, stating vaccination is recommended when the benefits outweigh the risks. (10).

Sri Lanka reported its first local COVID-19-infected patient in March 2020 and since then underwent three waves from which the country suffered the most in the third wave after the country lifted its travel restrictions in April 2021. The first COVID-19-related maternal death was reported in May 2021 and Sri Lanka commenced vaccination of pregnant women against COVID-19 in August 2021. All pregnant women in Sri Lanka were offered COVID-19 vaccines irrespective of their trimester (11).

Though the COVID-19 vaccines were aimed at safeguarding pregnant women from infection and its complications, their impact on the women's mental status remained questionable. The present study was designed based on the query of whether the anxiety levels had reduced due to the protection the vaccines provided or whether anxiety levels had increased, due to concerns regarding the safety of vaccines.

The purpose of the present study was to assess the antenatal anxiety levels, to determine the socio-demographic and clinical factors affecting antenatal anxiety, and to assess the association between COVID-19 vaccination status and antenatal anxiety following the COVID-19 vaccination program. The concerns of pregnant women and the sources accessed by pregnant

women for information on COVID-19 were also identified.

## METHODS

A descriptive cross-sectional study was conducted sixteen months after the initiation of the COVID-19 vaccination program in Sri Lanka, from December 2022 to January 2023. The study was carried out among pregnant women attending antenatal clinics at Teaching Hospital Mahamodara, Galle, which is the only tertiary maternity care hospital in the Southern Province of Sri Lanka.

Pregnant women with a viable pregnancy in all three trimesters were included in the study and pregnant women with a history of a psychiatric disorder or a diagnosed fetal anomaly were excluded. Antenatal clinics were chosen randomly and a consecutive sample of pregnant women were recruited.

The questionnaire was self-administered and contained two components; a self-designed questionnaire by the investigator based on the literature, and the validated Sinhala version of the Perinatal Anxiety Screening Scale (PASS-S) to assess the antenatal anxiety. The PASS is a reliable tool for screening perinatal anxiety, developed by Somerville et al., in 2014. It includes 31 items, assessing anxiety symptoms present during the past month, with a clinical cut-off value for anxiety at 26. The overall score ranges from 0-93 and categorizes anxiety into three levels; Asymptomatic (0 -20), mild to moderate anxiety (21-41), and severe anxiety (42-93).

Pregnant women who scored more than the clinical cut-off point in the PASS were referred to the Maternal Mental Health Clinic at the tertiary care centre for further evaluation by a Consultant Psychiatrist. Ethical approval for the study was obtained by the Ethical Review Committee, Faculty of Medicine, University of Ruhuna.

Data analysis was performed with the Statistical Package for Social Sciences (SPSS) 25.0. Association analysis was performed with Chi-square test and Fisher's exact for categorical variables and Pearson's correlation was employed to assess the relationship between continuous variables and PASS score. All the tests were two-tailed

with the statistical significance level set at < 0.05.

## RESULTS

A total of 224 pregnant women were recruited ranging from ages 17 to 46 years. The mean age was 30 years (SD 5.87). The socio-demographic characteristics of the sample are shown in Table 1.

Table 1. Socio-demographic characteristics of pregnant women

| Variable                                    | Category                   | N (%) |         |
|---------------------------------------------|----------------------------|-------|---------|
| <b>Educational level</b>                    | Up to GCE O/Levels         | 56    | (24.9%) |
|                                             | Passed GCE O/Levels        | 168   | (75.1%) |
| <b>Employment</b>                           | Unemployed                 | 129   | (57.6%) |
|                                             | Employed                   | 95    | (42.4%) |
| <b>Parity</b>                               | Primiparous                | 95    | (42.4%) |
|                                             | Multiparous                | 129   | (57.6%) |
| <b>Gestation</b>                            | 1 <sup>st</sup> Trimester  | 27    | (12.1%) |
|                                             | 2 <sup>nd</sup> Trimester  | 104   | (46.4%) |
|                                             | 3 <sup>rd</sup> Trimester  | 93    | (41.5%) |
| <b>Pregnancy-related complications</b>      | Uncomplicated              | 140   | (37.5%) |
|                                             | Complications present      | 84    | (62.5%) |
| <b>Vaccination status of pregnant women</b> | Received at least one dose | 212   | (94.6%) |
|                                             | Unvaccinated               | 12    | (5.4%)  |
| <b>Vaccination status of the spouse</b>     | Received at least one dose | 190   | (84.8%) |
|                                             | Unvaccinated               | 34    | (15.1%) |

Antenatal anxiety was present among 17.9% of pregnant women and the mean PASS score was 17.5 (SD 9.70). Table 1 shows the percentages of anxiety categories. The principal concern of pregnant women was the safety of the baby (36.6%) due to the COVID-19 pandemic,

Table 2. Perinatal anxiety categories

| Anxiety category        | N   | %    |
|-------------------------|-----|------|
| <b>Asymptomatic</b>     | 242 | 63.4 |
| <b>Mild to Moderate</b> | 75  | 33.5 |
| <b>Severe</b>           | 7   | 3.1  |

followed by the possibility of a family member getting infected with COVID-19 (21.0%), effects of the vaccine for the pregnancy (14.7%), and getting infected themselves (12.1%). Table 2 shows the sources utilized by the pregnant women to gain information on COVID-19. A majority had accessed either the television or newspapers (38.8%) and a collective of 21.9% had either consulted their consultant obstetrician, antenatal clinic

doctor, or their family physician. Maternal age ( $r = -0.080$ ,  $p = 0.235$ ) and average monthly income ( $r = -0.016$ ,  $p = 0.808$ ) both had slight negative correlations with the PASS score. Table 3 shows the associations of anxiety. COVID-19 vaccination status of the pregnant women or the spouse or a family member getting infected with COVID-19 did not have a significant influence on the antenatal anxiety levels. See Table 4.

Table 3. Sources of information accessed by pregnant women for information on COVID-19

| Source                         | N  | %    |
|--------------------------------|----|------|
| <b>Newspaper/ Television</b>   | 87 | 38.8 |
| <b>Social media</b>            | 49 | 21.9 |
| <b>Friend/ Family member</b>   | 28 | 12.5 |
| <b>Public Health Midwife</b>   | 11 | 4.9  |
| <b>Clinic doctor</b>           | 26 | 11.6 |
| <b>Family doctor</b>           | 15 | 6.7  |
| <b>Consultant obstetrician</b> | 8  | 3.6  |

Table 4. Association between antenatal anxiety and demographic, and obstetric variables

| Variable                          | Clinical anxiety |      | Normal |      | X <sup>2</sup> | p-value |
|-----------------------------------|------------------|------|--------|------|----------------|---------|
|                                   | n                | %    | n      | %    |                |         |
| <b>Parity</b>                     |                  |      |        |      |                |         |
| Primigravida                      | 16               | 7.14 | 79     | 35.2 | 0.116          | 0.734   |
| Multiparous                       | 24               | 10.7 | 105    | 46.8 |                |         |
| <b>Gestation</b>                  |                  |      |        |      |                |         |
| 1st and 2 <sup>nd</sup>           | 28               | 12.5 | 103    | 45.9 | 2.661          | 0.103   |
| 3 <sup>rd</sup> onwards           | 12               | 5.3  | 81     | 36.1 |                |         |
| <b>Complications in pregnancy</b> |                  |      |        |      |                |         |
| Normal                            | 50               | 22.3 | 90     | 40.1 | 0.128          | 0.235   |
| Complicated                       | 32               | 14.2 | 52     | 23.2 |                |         |
| <b>Maternal educational level</b> |                  |      |        |      |                |         |
| Up to O/Ls                        | 14               | 6.25 | 42     | 18.7 | 2.597          | 0.107   |
| O/L and higher                    | 26               | 11.6 | 142    | 63.3 |                |         |
| <b>Maternal employment</b>        |                  |      |        |      |                |         |
| Unemployed                        | 22               | 9.8  | 107    | 47.7 | 0.134          | 0.715   |
| Employed                          | 18               | 8.0  | 77     | 34.3 |                |         |

Table 5. COVID-19-related factors affecting anxiety

| Variable                                             | Clinical anxiety |      | Normal |      | X <sup>2</sup> /F<br>Fisher's<br>Exact<br>test | p-value |
|------------------------------------------------------|------------------|------|--------|------|------------------------------------------------|---------|
|                                                      | n                | %    | n      | %    |                                                |         |
| <b>Maternal COVID-19 vaccination status</b>          |                  |      |        |      |                                                |         |
| Vaccinated                                           | 39               | 17.4 | 173    | 77.2 |                                                | 0.698   |
| Unvaccinated                                         | 1                | 0.44 | 11     | 4.9  |                                                |         |
| <b>Vaccination status of spouse</b>                  |                  |      |        |      |                                                |         |
| Vaccinated                                           | 34               | 15.1 | 156    | 68.7 | 0.001                                          | 0.972   |
| Unvaccinated                                         | 6                | 2.6  | 28     | 12.5 |                                                |         |
| <b>Presence of a COVID-19-infected family member</b> |                  |      |        |      |                                                |         |
| Present                                              | 20               | 8.9  | 78     | 34.8 | 0.773                                          | 0.379   |
| Not present                                          | 20               | 8.9  | 106    | 47.3 |                                                |         |

## DISCUSSION

Antenatal anxiety disorders were recorded among 36.65% of pregnant women in Sri Lanka in 2017 (12). Studies conducted during the COVID-19 pandemic in Sri Lanka and the second wave of COVID-19 reported antenatal anxiety to be present among 17.5% and 17% of pregnant women respectively (5,13). Unlike the study in 2017, where a psychiatric evaluation was performed and antenatal anxiety disorders were diagnosed, the

studies conducted during the pandemic employed a screening tool to detect anxiety among pregnant women. The reduction might be attributed to a lack of a psychiatric evaluation and strict quarantine measures and travel restrictions employed in the country during the pandemic. Similarly, the present study conducted sixteen months after the initiation of the vaccination program, reported antenatal anxiety to be present

among 17.9%, and severe anxiety symptoms were detected among 3.1%.

The main concern of pregnant women was the safety of the baby and the possibility of a family member getting infected with COVID-19 similar to studies conducted in various countries (4,6,8). However, only a minority of pregnant women expressed concern over getting infected with COVID-19 themselves in contrast to women in other countries (3,4,6).

It was observed that a majority (38.8%) had accessed either the television or newspapers to gain knowledge on COVID-19 followed by 21.9% accessing social media. However, only 26.8% of pregnant women had opted to seek information from healthcare personnel. It emphasizes the importance of public health staff being sensitive to and addressing the concerns of pregnant women when providing antenatal care, and providing health education, especially during infectious epidemics. The public should be encouraged to approach healthcare personnel for information instead of approaching alternative sources.

Maternal age had a slight negative correlation which was not statistically significant, with the anxiety levels, implying that the younger pregnant women have reported higher anxiety scores on par with a Sri Lankan study conducted during the pandemic (5). Though higher educational levels and increased average family income were reported to be associated with the presence of anxiety in pregnant women the current study showed no association (5,7).

A study conducted in the United States reported that fear of the effects on the fetus and preparing for birth during a pandemic was more influential on anxiety than obstetric factors (9). Similarly, parity, gestation, and the presence of a complicated pregnancy were not associated with anxiety in pregnant women.

The COVID-19 vaccination status of the pregnant woman and the spouse as well as the presence of a COVID-19-infected family member were not associated with anxiety. This might be attributed to the extensive health education programs and vaccination promotion campaigns conducted by the Ministry of Health in Sri Lanka.

## CONCLUSIONS AND RECOMMENDATIONS

Antenatal anxiety after the vaccination campaign for COVID-19 in Sri Lanka was similar to recorded anxiety levels before the initiation of the vaccination program in the country (17.9% vs 17.5%). The study emphasizes the importance and requirement of a routine practice to be established to screen for antenatal anxiety through antenatal clinics, especially during future pandemics. The COVID-19 vaccination status has not had a significant impact on antenatal anxiety among pregnant women in Sri Lanka. The majority had concerns about COVID-19 affecting the fetus and only a minority was concerned about the COVID-19 vaccination itself. Newspapers and television, followed by social media were accessed by a majority to gain information on COVID-19, rather than consulting medical professionals. The study implies the need to collaborate with mass media and social media to provide health education to the public to reach a wider audience. Similarly, the public should be motivated to reach medical professionals rather than rely on unofficial sources when gaining information, especially for vulnerable conditions such as pregnancy. Since Sri Lanka is equipped with a strong public health sector, the public health staff, especially the Public Health Midwives and Medical Officers of Health (MOH) should be trained and encouraged to be more sensitive to and address the concerns of pregnant women during stressful periods such as infectious pandemics, during their encounters with the pregnant women at antenatal sessions or during domiciliary visits.

**Limitations.** The study was conducted sixteen months following the initiation of the COVID-19 vaccination campaign in Sri Lanka when the pandemic was more in control and travel restrictions had been lifted. It would have contributed to generating a relatively safer environment for pregnant women. Sri Lanka was at the initial stage of an economic crisis and social unrest at the time, which could have caused the anxiety levels to remain the same as during the COVID-19 waves in Sri Lanka.

The study was a single-centre study conducted in the Southern province of Sri Lanka, which would have limited the generalizability of anxiety levels across the country.

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