

Antenatal anxiety and depression: Frequency and correlates during the COVID-19 pandemic in Pakistan

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ABSTRACT

Context: Mental health ailments like anxiety and depression are common during the antenatal period. Uncertainty during COVID-19 pandemic has markedly increased its prevalence in the general population. Pregnancy, being emotionally and physically exhausting, makes mothers more susceptible to developing mental disorders like anxiety and depression. **Aims:** To investigate prevalence and associated risk factors of antenatal anxiety and depression among women in Karachi, Pakistan. **Settings and Design:** This cross-sectional study was conducted in the department of obstetrics and gynecology during May 2020 till May 2021. **Methods and Material:** The study explored anxiety, depression, and associated factors in pregnant women attending antenatal clinics at a tertiary care hospital located in Karachi, Pakistan, during the COVID-19 pandemic by using the hospital anxiety and depression scale (HADS) as a screening tool. **Statistical Analysis:** Data was entered in SPSS version 21 for statistical analysis. **Results:** A total of 390 patients were enrolled in the study with mean age of 28.06 ± 4.52 years. Mean week of pregnancy at the time of enrolment into the study was 32.7 ± 3.1 . Prevalence of anxiety and depression was 46.7% and 33.1%, respectively. On multivariable analysis, polyhydramnios was a risk factor of anxiety, whereas low income and unplanned pregnancy were substantially linked to depression. Fear of visiting doctor was a common risk factor for both anxiety and depression. **Conclusion:** In a catastrophe like the COVID-19 pandemic, attempts to address heightened anxiety during antenatal visits will undoubtedly benefit maternal and fetal mental health. As a response, strategies to manage high anxiety symptoms should be taken into consideration.

Keywords: Antenatal, COVID-19, depression, perinatal anxiety

Introduction

Anxiety and depression are the two most common mental health disorders worldwide. The World Health Organization (WHO) estimates that 4.4% of the total population suffers from depressive disorders and 3.6% from anxiety disorders.^[1] Many studies report that women are at least twice as likely as men to experience depression and anxiety.^[2,3]

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Pregnancy, being emotionally and physically exhausting, makes mothers more susceptible to developing mental disorders which is especially prevalent in second and third trimesters.^[4] Mental health ailments like anxiety and depression are estimated to be prevalent in 10%–15% of women in industrialized countries and 20%–40% in developing countries during the antenatal or postnatal period. Pre-pandemic studies from Pakistan, for example a hospital-based study from Karachi revealed that 25% of pregnant women were suffering from anxiety and 42.3% from depression. Young maternal age, lower educational level, low income, domestic violence, low social support, unwanted pregnancy, history of depression and previous prenatal loss were associated with antenatal depression.^[5–7]

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The pandemic is a public health emergency of international concern which not only poses a challenge to psychological resilience worldwide but has alarming implications for individual and collective mental and physical health. This can lead to impairment in social, emotional, and physical functioning, resulting in a high healthcare service utilization and, thereby, the cost of care. The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) became a global pandemic in January 2020. Imposed quarantine or isolation is an unpleasant experience that causes psychosocial problems, especially among vulnerable populations such as children and women.^[8,9] Studies revealed increased stress in the general population during the COVID-19 pandemic.^[10,11] Among mental health illnesses, depression was found to be the predominant manifestation.^[12] A recent study among pregnant women in Canada showed an increase in perinatal anxiety and depression,^[13] while another study from Kuwait revealed that both nulliparous and multiparous women had higher odds of depression during the pandemic.^[14]

A review and meta-analysis reported significantly elevated rates of antenatal depression and anxiety during the pandemic worldwide, but clinically elevated prenatal anxiety symptoms were predominant. The similar study also observed that studies with data collected later in the pandemic reported higher anxiety prevalence, potentially linked to exposure to chronic stressors and ongoing uncertainty created by said pandemic.^[15] Asian countries face the challenges of addressing numerous barriers and limitations and similarly, the opportunity to implement those recommendations which are proposed in the research done until now.^[11] Moreover, talking about mental health is considered taboo and is generally not explored or addressed during pregnancy in the Asian population.^[16]

In Pakistan, social norms and adversities like poverty, illiteracy, lack of access to basic needs and especially health-seeking behaviors differ from that of developed countries and hence predispose such individuals to poor mental health. During challenging times like the COVID-19 pandemic, these gaps may have further increased and aggravated the situation especially among vulnerable groups like pregnant women.^[9] Similarly, the incidence and, hence, prevalence of mental health diseases increased in developing countries like Pakistan.^[17] Pakistan, being a resource-sparse country with restricted assets for antenatal care, is expected to considerably face financial vulnerability and precariousness overlaid by the COVID-19 outbreak.

To our knowledge, only one qualitative study in Rawalpindi, Pakistan, reported heightened anxiety among antenatal patients during the pandemic.^[18] It was carried out early during the pandemic with a limited sample size that did not focus on the risk factors associated with anxiety or depression. Karachi is the largest city in the province of Sindh, accommodating many different languages, cultures, and norms which markedly differ from the other provinces. Considering these dissimilarities, our study was designed to investigate prevalence and associated risk factors of antenatal

anxiety and depression in pregnant women living in Karachi, Pakistan. Furthermore, this study may help us suggest and plan mental health interventions for women presenting for antenatal care in a resource-limited country during a health catastrophe like the COVID-19 pandemic.

Material and Methods

Study design and setting

This cross-sectional study was conducted among antenatal women attending antenatal clinics at a tertiary care hospital located in Karachi, Pakistan.

Study duration

Assessments were conducted between May 2020 till May 2021 during the peak of Pakistan's pandemic response and lockdown.

Inclusion and exclusion criteria

All the pregnant women in the second and third trimesters of pregnancy presenting to the antenatal clinics were included in this study. Those women who had known psychiatric illnesses in the past or were using anti-depressants currently were excluded from the study.

Ethical consideration

An approval from the ethical review board of the Hospital (Ref#0554-2020LNH-ERC) was obtained before data collection. Pregnant women were registered for this study with their written informed consent.

Sample size estimation and sampling technique

The sample size was calculated using OpenEpi software with a confidence interval of 95% and a precision of 5%. Since no previous study among antenatal patients during a pandemic was available, the percentage of depression and anxiety previously reported in our population (18%–34%)^[6] was used to calculate the sample size. The sample size calculated was 384 participants. Non-probability consecutive sampling technique was used to enroll study participants.

Study instrument

Anxiety and depression were diagnosed based on the hospital anxiety and depression scale (HADS). HADS is a reliable fourteen-item self-assessment tool used in outpatient hospital clinics to assess the levels of anxiety (seven items) and depression (seven items) experienced by patients, with each item scored from 0-3. A total score of ≥ 8 on the depression and anxiety scale was considered a positive case. Anxiety or depression status was regarded as the main outcome variable. The Urdu translated version of HADS was validated and used in Pakistan in many types of research and was recently validated for the assessment of antenatal depression and anxiety in the Pakistani population.^[7]

Data analysis

Data was entered in the Statistical Package for the Social Sciences (SPSS) version 21 for statistical analysis. Categorical variables were presented as frequencies and percentages. Mean \pm standard deviation was calculated to summarize normally distributed numerical variables, whereas non-normal numerical variables were summarized as median with inter-quartile range. The assumption of normality was tested with the Shapiro–Wilk test. Chi-squared or Fisher’s exact test was applied to compare categorical variables among two groups of study participants. Univariable logistic regression was applied to determine the association of patients’ characteristics with depression and anxiety. Variables showing $P < 0.25$ in the univariable regression model were further added in the final regression model to compute adjusted odds ratio (OR) and their 95% confidence interval (CI). A P value of less than or equal to 0.05 was considered as statistically significant on final regression model.

Guidelines for reporting

The manuscript was prepared in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.^[19]

Results

Sociodemographic characteristics, clinical features and fear of COVID-19

A total of 390 patients were enrolled in the study. The mean age of the study participants was 28.06 ± 4.52 years. Mean week of pregnancy at the time enrolment into the study was 32.7 ± 3.1 . Median gravida was 2 (range = 1–8) whereas median parity was 1 (range = 0–5). Descriptive statistics for participants’ sociodemographic and clinical features and fear of COVID-19 among them is depicted in Table 1.

Prevalence of anxiety and depression, and comparison of participants’ characteristics among anxious and depressed patients

The median anxiety and depression score was 7 (range = 0–7) and 6 (range = 0–16), respectively. Figure 1 portrays the prevalence of anxiety and depression among study participants. Table 2 shows the comparison of participants’ characteristics

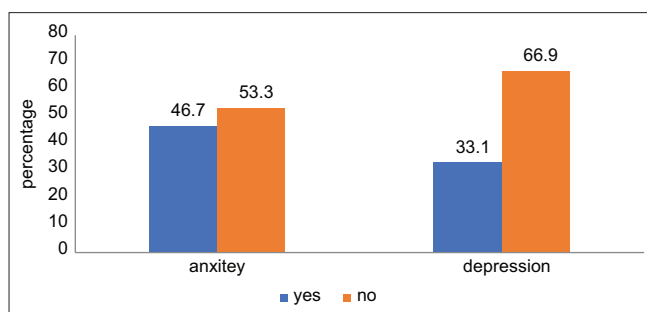


Figure 1: Prevalence of anxiety and depression among study participants

among pregnant women with and without anxiety. Frequency of comorbidity, high blood pressure, pregnancy-induced hypertension, polyhydramnios, the pressure of male birth, and feeling uncomfortable when visiting a doctor due to COVID-19 were significantly different between patients with and without anxiety.

Table 2 also shows the comparison of participants’ characteristics among pregnant women with and without depression. Frequency of husband’s occupation, pregnancy-induced hypertension, household income and planned pregnancy were significantly different among depressed and non-depressed pregnant women.

Univariate and multivariable association of anxiety with other study variables

Table 3 shows univariable and multivariable regression of factors associated with anxiety. On the multivariable model, polyhydramnios was significantly associated with anxiety when the model was adjusted for other covariates. The risk of anxiety was significantly lower in those who were comfortable with visiting doctors during the COVID-19 pandemic [Table 3].

Univariate and multivariable association of depression with other study variables

On univariate analysis, the husband’s occupation was significantly associated with depression, with higher risk being among shopkeepers’ wives than those of office workers. The risk of depression was significantly higher among women who had hypertension during pregnancy than those who did not report this complication. Total family income was also associated with depression on univariable model, with higher odds of depression being among low-income rather than the high-income groups. The risk of depression was significantly lower for those who had planned pregnancy than those who conceived unintentionally [Table 4]. On multivariable regression analysis, the risk of depression was more than two times high among the total low-income group as compared to the high-income group. Odds of depression were significantly lower among those who did not feel anxious while visiting the doctor during the COVID-19 pandemic than those who had this fear [Table 4].

Discussion

Results from this study revealed that the frequency of antenatal anxiety was almost twice (46.7%) during the pandemic as compared to 20%–25% at baseline in Karachi.^[20] The escalating anxiety levels are consistent with many studies conducted worldwide which show rising anxiety levels among pregnant women.^[15] A novel and important finding in our univariable analysis was the relationship between anxiety in women and gender discrimination within the family. Considering societal pressures, pregnant women who have already given birth to one or more daughters were previously found to be more anxious for their son’s birth.^[21] In Pakistan, the family system is predominantly patriarchal, with parents viewing their boys as breadwinners and agents that will continue

Table 1: Descriptive statistics for participants' sociodemographic and clinical features and fear of COVID-19 among them

| Variables | Groups | Frequency | Percentage |
|---|--------------------------------------|-----------|------------|
| Sociodemographic characteristics | | | |
| Age | < 35 years | 352 | 90.3 |
| | ≥ 35 years | 38 | 9.7 |
| Participant's occupation | Housewife | 312 | 80.0 |
| | Working | 78 | 20.0 |
| Husband's occupation | Doctor | 7 | 1.8 |
| | Nurse | 17 | 4.4 |
| | Engineer | 106 | 27.2 |
| | Shopkeeper | 21 | 5.4 |
| | Mechanic | 9 | 2.3 |
| | Any other | 230 | 59.0 |
| Total household income | < 25,000 PKR | 92 | 23.6 |
| | 25,000-50,000 PKR | 190 | 48.7 |
| | 50,000-75,000 PKR | 62 | 15.9 |
| | 75,000-100,000 PKR | 46 | 11.8 |
| Having any house help or anyone in your house helps you with your chores? | - | 253 | 64.9 |
| This pregnancy was planned. | - | 142 | 36.4 |
| There was pressure for son birth or gender discrimination in your family? | - | 58 | 14.9 |
| Clinical Features | | | |
| Antenatal weeks | 26-30 weeks | 115 | 29.5 |
| | > 30 weeks | 275 | 70.5 |
| Comorbid | - | 67 | 17.2 |
| Diabetes | - | 23 | 5.9 |
| Hypothyroid | - | 15 | 3.8 |
| Hypertension | - | 22 | 5.6 |
| Asthma | - | 6 | 1.5 |
| Gravida | 1 | 138 | 35.4 |
| | > 1 | 252 | 64.6 |
| Parity | < 1 | 176 | 45.1 |
| | ≥ 1 | 214 | 54.9 |
| Adverse previous pregnancy outcomes | None | 266 | 68.2 |
| | Miscarriages/ intra-uterine death | 124 | 31.8 |
| Females had complications in this pregnancy | - | 88 | 22.6 |
| Gestational diabetes | - | 35 | 9.0 |
| Females had pregnancy-induced hypertension | - | 21 | 5.4 |
| Low birth weight | - | 15 | 3.8 |
| Polyhydramnios | - | 10 | 2.6 |
| Others | - | 5 | 1.3 |
| Fear of COVID-19 | | | |
| Feeling anxious/uncomfortable during COVID -19 pandemic visiting your doctor? | Yes | 147 | 37.7 |
| | May be | 50 | 12.8 |
| | No | 193 | 49.5 |
| Feeling scared/anxious regarding COVID-19 these days? | - | 150 | 38.5 |
| Experienced cold/flu in past 2 months? | - | 55 | 14.1 |
| COVID-19 test was done | - | 55 | 14.1 |

the family name. Even after birth, sons are given priority over daughters in terms of healthcare and educational needs. Hence women are generally more anxious due to preference for male offspring among the South Asian population. Our data imply that, as a result of their preference for male children, women become more concerned about the gender of their future baby, resulting in a higher frequency of anxiety, which was an unchanged factor for anxiety in women in the pre-pandemic era.

The COVID-19 pandemic solidified social distancing and self-isolation, posing a threat to mental health and wellbeing.^[8] It is already known that low social support can trigger a sense of isolation and loneliness, and pregnant women who perceived low social support had higher rates of both depression and anxiety.^[22] As the pandemic progressed and measures were being taken to prevent COVID-19 transmission through lockdowns, travel restrictions, and social distancing, difficulty in accessing

Table 2: Comparison of participants' characteristics among anxious and depressed patients

| Study variables | Anxiety | | | Depression | | |
|--|------------|------------|----------|------------|------------|---------|
| | Yes n (%) | No n (%) | P | Yes n (%) | No n (%) | P |
| Age | | | | | | |
| < 35 years | 163 (46.3) | 189 (53.7) | 0.665 | 115 (32.7) | 237 (67.3) | 0.604 |
| ≥ 35 years | 19 (50) | 19 (50) | | 14 (36.8) | 24 (63.2) | |
| Occupation of participants | | | | | | |
| Housewife | 149 (47.8) | 163 (52.2) | 0.388 | 105 (33.7) | 207 (66.3) | 0.628 |
| Working | 33 (42.3) | 45 (57.7) | | 24 (30.8) | 54 (69.2) | |
| Occupation of husband | | | | | | |
| Office job | 105 (45.7) | 125 (54.3) | †0.243 | 78 (33.9) | 152 (66.1) | †*0.049 |
| Doctor | 3 (42.9) | 4 (57.1) | | 6 (85.7) | 1 (14.3) | |
| Nurse | 6 (35.3) | 11 (64.7) | | 3 (17.6) | 14 (82.4) | |
| Engineer | 52 (49.1) | 54 (50.9) | | 31 (29.2) | 75 (70.8) | |
| Shopkeeper | 14 (66.7) | 7 (33.3) | | 13 (61.9) | 8 (38.1) | |
| Mechanic | 2 (22.2) | 7 (77.8) | | 3 (33.3) | 6 (66.7) | |
| Gravida | | | | | | |
| 1 | 57 (41.3) | 81 (58.7) | 0.116 | 40 (29) | 98 (71) | 0.204 |
| > 1 | 125 (49.6) | 127 (50.4) | | 89 (35.3) | 163 (64.7) | |
| Parity | | | | | | |
| < 1 | 77 (43.8) | 99 (56.2) | 0.295 | 52 (29.5) | 124 (70.5) | 0.179 |
| ≥ 1 | 105 (49.1) | 109 (50.9) | | 77 (36) | 137 (64) | |
| Diabetes | 13 (56.5) | 10 (43.5) | 0.329 | 10 (43.5) | 13 (56.5) | 0.274 |
| Hypertension | 15 (68.2) | 7 (31.8) | *0.037 | 11 (50) | 11 (50) | 0.082 |
| Hypothyroid | 4 (26.7) | 11 (73.3) | 0.113 | 4 (26.7) | 11 (73.3) | †0.781 |
| Asthma | 4 (66.7) | 2 (33.3) | †0.424 | 3 (50) | 3 (50) | †0.402 |
| Previous adverse pregnancy outcomes | | | | | | |
| None | 120 (45.1) | 146 (54.9) | 0.368 | 88 (33.1) | 178 (66.9) | 0.997 |
| Miscarriages/IUD | 62 | 62 (50.4) | | 41 (33.1) | 83 (67.5) | |
| Antenatal weeks | | | | | | |
| 26-30 weeks | 58 (50.4) | 57 (49.6) | 0.335 | 33 (28.7) | 82 (71.3) | 0.234 |
| > 30 weeks | 124 (45.1) | 151 (54.9) | | 96 (34.9) | 179 (65.1) | |
| Gestational diabetes | 20 (57.1) | 15 (42.9) | 0.193 | 14 (40) | 21 (60) | 0.362 |
| Pregnancy-induced hypertension | 16 (76.2) | 5 (23.8) | **0.005 | 13 (61.9) | 8 (38.1) | **0.004 |
| Low birth weight | 9 (60) | 6 (40) | 0.291 | 5 (33.3) | 10 (66.7) | †1.000 |
| Polyhydramnios | 9 (90) | 1 (10) | †**0.007 | 2 (20) | 8 (80) | †0.507 |
| Others | 4 (80) | 1 (20) | †0.133 | 5 (80) | 1 (20) | †*0.043 |
| Household income | | | | | | |
| < 25,000 PKR | 50 (54.3) | 42 (45.7) | 0.327 | 40 (43.5) | 52 (56.5) | *0.016 |
| 25,000-50,000 PKR | 81 (42.6) | 109 (57.4) | | 56 (29.5) | 134 (70.5) | |
| 50,000-75,000 PKR | 29 (46.8) | 33 (53.2) | | 24 (38.7) | 38 (61.3) | |
| 75,000-100,000 PKR | 22 (47.8) | 24 (52.2) | | 9 (19.6) | 37 (80.4) | |
| House help | | | | | | |
| Yes | 116 (45.8) | 137 (54.2) | 0.660 | 78 (30.8) | 175 (69.2) | 0.200 |
| No | 66 (48.2) | 71 (51.8) | | 51 (37.2) | 86 (62.8) | |
| Planned pregnancy | | | | | | |
| Yes | 62 (43.7) | 80 (56.3) | 0.368 | 32 (22.5) | 110 (77.5) | **0.001 |
| No | 120 (48.4) | 128 (51.6) | | 97 (39.1) | 151 (60.9) | |
| Pressure for male birth, or gender discrimination in the family? | | | | | | |
| Yes | 34 (58.6) | 24 (41.4) | *0.048 | 19 (32.8) | 39 (67.2) | 0.955 |
| No | 148 (44.6) | 184 (55.4) | | 110 (33.1) | 222 (66.9) | |
| Anxiety during pandemic for visiting a doctor? | | | | | | |
| Yes | 82 (55.8) | 65 (44.2) | *0.014 | 54 (36.7) | 93 (63.3) | 0.337 |
| No | 77 (39.9) | 116 (60.1) | | 57 (29.5) | 136 (70.5) | |
| May be | 23 (46) | 27 (54) | | 18 (36) | 32 (64) | |
| Did you have COVID-19 test done? | | | | | | |
| Yes | 24 (43.6) | 31 (56.4) | 0.627 | 17 (30.9) | 38 (69.1) | 0.712 |
| No | 158 (47.2) | 177 (52.8) | | 112 (33.4) | 223 (66.6) | |

†Fisher's exact test was reported, *Significant at $P < 0.05$, **Significant at $P < 0.01$

Table 3: Univariate and multivariable association of participants' characteristics with anxiety

| Study variables | OR (95% CI) | P | aOR (95% CI) | P |
|---|--------------------|---------|--------------------|--------|
| Occupation of husband | | | | |
| Office job | Ref | | Ref | |
| Doctor | 0.89 (0.2-4.08) | 0.884 | 0.98 (0.2-4.70) | 0.975 |
| Nurse | 0.65 (0.23-1.82) | 0.410 | 0.56 (0.18-1.67) | 0.295 |
| Engineer | 1.15 (0.72-1.82) | 0.561 | 1.18 (0.73-1.92) | 0.496 |
| Shopkeeper | 2.38 (0.93-6.12) | 0.072 | 2.13 (0.79-5.72) | 0.134 |
| Mechanic | 0.34 (0.07-1.7) | 0.184 | 0.36 (0.07-1.85) | 0.222 |
| Gravida | | | | |
| 1 | 0.72 (0.47-1.09) | 0.117 | 0.77 (0.49-1.19) | 0.238 |
| > 1 | Ref | | Ref | |
| Hypertension | 2.58 (1.03-6.47) | *0.044 | 1.25 (0.37-4.24) | 0.724 |
| Hypothyroid | 0.40 (0.13-1.29) | 0.125 | 0.40 (0.12-1.36) | 0.143 |
| Gestational diabetes | 1.56 (0.79-3.20) | 0.196 | 1.76 (0.85-3.66) | 0.128 |
| Pregnancy-induced hypertension | 3.91 (1.40-10.91) | **0.009 | 3.54 (0.95-13.29) | 0.060 |
| Polyhydramnios | 10.77 (1.35-85.84) | *0.025 | 11.98 (1.45-98.95) | *0.021 |
| Pressure for male birth/gender discrimination in family | | | | |
| Yes | 1.76 (1.0-3.10) | *0.050 | 1.48 (0.81-2.70) | 0.200 |
| No | Ref | | Ref | |
| Apprehension during COVID-19 pandemic for visiting a doctor | | | | |
| Yes | Ref | | Ref | |
| No | 0.53 (0.34-0.81) | **0.004 | 0.52 (0.33-0.82) | *0.005 |
| May be | 0.68 (0.35-1.29) | 0.232 | 0.63 (0.32-1.24) | 0.181 |

aOR=Adjusted odds ratio CI: = Confidence interval, OR=Odds ratio, Ref=Reference category * Significant at $P<0.05$, **Significant at $P<0.01$

healthcare facilities further contributed to stress and, thereby, anxiety during the antenatal period. Many pregnant women were worried about visiting their physicians due to apprehensions of being exposed to the virus in the hospital environment or during commute in the early pandemic period.^[10] In our study, women who were less apprehensive to visit the doctor during the pandemic had a lower frequency of anxiety. This may be a paradox, as women who are more anxious have higher anxiety levels even at baseline. A similar study conducted in China during the lockdown showed that restrictions in hospitals led many women to take the decision to give birth at home, exposing them to risks such as complications in childbirth without adequate care.^[23] Keeping these concerns in mind, the state should continue to develop plans to improve pregnant women's access to healthcare in a way that is socially acceptable.

Previously studied factors like parity and occupation of women, which were found to be associated with antenatal anxiety and depression in our population, were not found to be significant in our study. This could be because COVID-19 raised different concerns for homemakers, such as cleanliness, sanitization and child care, during the pandemic. This is reinforced by a recent study reporting an enhanced threat of COVID-19 for their other children than themselves and their pregnancy.^[24] Analogous findings were also reported in the Canadian population, which showed no association of parity with anxiety during the pandemic; however, nulliparous individuals had higher pregnancy-related anxiety symptoms.^[13]

One-third of participants were found to be depressed during the pandemic, which is higher than previously

reported (16.8%-23.3%) in Karachi, using similar tools.^[5,16] Antenatal depression was shown to be associated with domestic violence and unplanned pregnancy previously in our population.^[6] Similar results were found in this study where two-thirds of the women who were depressed reported an unplanned pregnancy. Unplanned pregnancies are challenging and put women under mental pressure. General awareness regarding contraception should be ensured and emphasis should be given on birth spacing and planning of future pregnancies during the antenatal and postpartum period.

Financial burden is another stressor known to impact maternal mental health and is a known risk factor for prenatal depression in our population.^[25] High monthly income was seen to be a protective factor of prenatal anxiety in a recently reported survey in China.^[26] People earning daily wages were affected the most during the lockdown period, and hence, the rates of depression were higher in women whose husbands were shopkeepers compared to those who had monthly fixed salaries in our study population. Likewise, data collected from different countries during the pandemic reported low income as a poor predictor of mental health in pregnant women.^[26,27]

Antenatal complications like polyhydramnios and hypertension were more prevalent among women who were depressed and anxious than those who did not have any complications in the current pregnancy. This is an important finding, as previously done studies in Pakistan excluded patients with medical disorders or complications in pregnancy.^[25] Hence the burden of mental health disease in our population with other comorbid illnesses in antenatal period is unknown in our population. A recent

Table 4: Univariate and multivariable association of participants' characteristics with depression

| Study variables | OR (95% CI) | P | aOR (95% CI) | P |
|--|------------------|---------|------------------|---------|
| Occupation of husband | | | | |
| Office job | Ref | | Ref | |
| Doctor | 0.33 (0.04-2.75) | 0.302 | 0.46 (0.05-4.23) | 0.493 |
| Nurse | 0.42 (0.12-1.50) | 0.180 | 0.35 (0.09-1.34) | 0.125 |
| Engineer | 0.81 (0.49-1.33) | 0.396 | 0.86 (0.5-1.50) | 0.601 |
| Shopkeeper | 3.12 (1.26-7.96) | *0.014 | 2.57 (0.94-7.08) | 0.067 |
| Mechanic | 0.97 (0.24-4) | 0.971 | 1.04 (0.24-4.53) | 0.963 |
| Gravida | | | | |
| 1 | 0.75 (0.48-1.17) | 0.204 | 1.09 (0.46-2.57) | 0.841 |
| ≥ 1 | Ref | | Ref | |
| Parity | | | | |
| < 1 | 0.75 (0.49-1.14) | 0.179 | 0.73 (0.32-1.65) | 0.445 |
| ≥ 1 | Ref | | Ref | |
| Hypertension | 2.12 (0.89-5.03) | 0.089 | 1.07 (0.31-3.68) | 0.913 |
| Antenatal weeks | | | | |
| 26-30 weeks | 0.75 (0.47-1.21) | 0.235 | 0.70 (0.42-1.18) | 0.179 |
| > 30 weeks | Ref | | Ref | |
| Blood pressure | 3.54 (1.43-8.79) | **0.006 | 2.79 (0.79-9.93) | 0.112 |
| Household income | | | | |
| < 25,000 PKR | 3.16 (1.36-7.30) | **0.007 | 2.75 (1.06-7) | *0.035 |
| 25,000-50,000 PKR | 1.72 (0.78-3.76) | 0.181 | 1.82 (0.77-4.30) | 0.170 |
| 50,000-75,000 PKR | 2.60 (1.07-6.32) | *0.036 | 2.58 (1-6.65) | *0.049 |
| 75,000-100,000 PKR | Ref | | Ref | |
| Do you have any house help or anyone in your house helps you with your chores? | | | | |
| Yes | 0.75 (0.49-1.16) | 0.201 | 0.98 (0.61-1.59) | 0.939 |
| No | Ref | | Ref | |
| Anxiety during pandemic for visiting a doctor? | | | | |
| Yes | Ref | | Ref | |
| No | 0.72 (0.46-1.14) | 0.161 | 0.59 (0.36-0.96) | *0.035 |
| May be | 0.97 (0.50-1.89) | 0.926 | 0.70 (0.34-1.47) | 0.345 |
| Planned pregnancy? | | | | |
| Yes | 0.45 (0.28-0.72) | **0.001 | 0.47 (0.28-0.77) | **0.003 |
| No | Ref | | Ref | |

aOR=Adjusted odds ratio, CI=Confidence interval, OR=Odds ratio, Ref=Reference category * Significant at $P < 0.05$, **Significant at $P < 0.01$

study conducted in Qatar revealed that women who experienced complications in pregnancy did not score higher on Patient Health Questionnaire Anxiety-Depression Scale score than those without complications.^[28] Another study reported increased prevalence of anxiety during the COVID-19 pandemic in high-risk pregnant women compared to pregnancies with no risk factors.^[29] Hence, data was contradictory; nonetheless it is a known fact that complications in pregnancy are a cause of maternal stress and children whose mothers experience high prenatal stress are at higher risk of cognitive and behavioral problems, as well as mental illness in their own lives.

Key Message and Recommendations

The escalating anxiety and high rate of depression during the antenatal period have alarming implications on maternal and neonatal health. Hence, there is an urgent need to address mental health illnesses such as anxiety and depression in vulnerable populations such as pregnant individuals during this critical time to lessen the negative term outcomes. Therefore, it is important

to specifically address the mental health of women with antenatal complications so that the incidence of mental health disorders can be reduced.^[30]

E-health mental services should be made accessible to the vulnerable population and every visit should be taken as an opportunity to screen and counsel during the antenatal period, as health literacy itself may improve the frequency of antenatal anxiety and depression, especially during the pandemic. The factors leading to anxiety and depression amongst each population varies according to social circumstances and should be taken into consideration.

Strengths and Limitations

This was a single center study, using a single hospital-based tool for screening for anxiety and depression, so results are not generalizable. Yet, conducting this study in a hospital setting avoided the participation bias of online surveys usually deployed in the pandemic; for example, unique characteristics of the

participants willing to fill online surveys and variable responses due to failure to read or interpret the questions. A causative relationship could have been established by a longitudinal study and the incidence of anxiety and depression could have been determined. We intended to follow-up patients in the postpartum period but were unable to get a response due to a lack of a primary care system and continuity of care.

Conclusion

Polyhydramnios and feeling comfortable with visiting doctors during the COVID-19 pandemic were identified as independent factors associated with anxiety in our study. One-third of participants were found to be depressed. On multivariable regression analysis, low income and feelings of anxiety while visiting the doctor during the COVID-19 pandemic were associated factors of depression. Unplanned pregnancy and a low family income were both substantially linked to depression during the COVID-19 era.

Ethical policy and institutional review board statement

The study was approved from Hospital Ethics Committee (Ref App#0554-2020LNH-ERC).

Patient declaration of consent statement

Patients images were not used in this study.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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