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## ORIGINAL ARTICLE

**Expectations of childbirth and anxiety in at term pregnant women during the SARS-CoV-2 pandemic in Spain: A pilot study**

**Short title: Expectations of Childbirth and SARS-CoV-2**

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## ABSTRACT

**Objective.** Evaluate the expectations of childbirth and anxiety/depression risks during the SARS-CoV-2 pandemic in pregnant women at term.

**Materials and Methods.** We evaluated the last objectives in a group of 113 gravids of 37 to 41 weeks of gestation with, respectively, the Slade-Pais expectations of Childbirth Scale (SPECS) and the Hospital Anxiety and Depression Scale (HADS).

**Results.** The mean SPECS score was  $145.5 \pm 20.8$ , and 56.1% of pregnant women had a high level of anxiety and depression ( $HADS \geq 11$ ) associated with their subjective perceptions on the risk of SARS-CoV infection. Mean HADS scores were significantly higher concerning SPECS sub-scales staff and service responsive to needs, fear, out of control and embarrassment, partner's coping, and positive anticipation of birth. The multiple regression analysis showed that a high total SPECS score was associated with a high HADS score, non-caucasian ethnicity, and having positive SARS-CoV-2 testing.

**Conclusions.** Pregnant women at term had high SPECS scores associated with a high prevalence of depression and anxiety during the SARS-CoV-2 pandemic. The identification of SARS-CoV-2 pandemic related factors involved in fear of childbirth or tokophobia may allow designing interventions to reduce the risk of anxiety, depression, and fear of childbirth to improve the delivery experience.

## INTRODUCTION

The severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) pandemic has dramatically changed our world<sup>1</sup>. The health consequences of this coronavirus are distressing: death, strained health care systems, behavioral and societal changes, new research objectives, and economic uncertainty. The medical, psychological, and social

consequences may be equally devastating, especially among children, women, and elders<sup>2-5</sup>. People have been physically isolated from family, friends, community, and schools. There is a growing urgency to understand the impact of the SARS-Co-V-2 pandemic on mental health to best prevent the emergence of severe mental illness as a secondary consequence<sup>6</sup>.

Pregnancy is usually a time of emotional and physical adjustments, and the ongoing SARS-CoV-2 pandemic may increase the risk of psychosomatic disturbances in gravids. Labor, delivery, and the early postpartum period are associated with significant changes and stress. Concerns about postpartum blues and depression have also existed during the pandemic. Women within the perinatal period are a vulnerable population, both physiologically, with changes during pregnancy that reduce immunity<sup>7</sup>, and psychologically increasing risks of distress, anxiety, depression, and tokophobia<sup>8-10</sup>. All of which may increase maternal and neonatal morbidity<sup>6</sup>. The fear of fetal malformation, genetic disease, or obstetric complications is a relevant issue for gravids and their family<sup>11</sup>.

Since the new SARS-CoV-2-related recommendations during delivery, including the social distance, the lack of support from the husband and the family may increase negative feelings about the time of delivery<sup>12</sup>.

This study aimed (i) to assess at term gravids' expectations and fear of childbirth using the Slade-Pais Expectations of Childbirth Scale (SPECS)<sup>13,14</sup>, and (ii) their relationships with anxiety and depression risks during the SARS-CoV-2 pandemic.

## MATERIALS AND METHODS

### Participants and procedures

This cross-sectional study included 113 consecutive pregnant women aged over 18 years, studied between the 37th to 41st weeks of gestation, presenting for obstetric care at the Fetal Wellbeing Unit of the Torrecardenas Hospital (Almería, Spain), between April 1, 2020, and November 26, 2020. The minimal sample needed was calculated to be 105 gravids. The data were self-completed while performing the fetal non-stressful test, under the tutorial of either midwives or obstetric specialists. No patients refused to participate in the study. Since the small sample size, subgroup, interaction, and sensitivity analyses were not possible.

The socio-demographic questionnaire included age, level of education and job, nationality, unhealthy habits (tobacco use, alcohol use), and current economic or marital problems. Obstetrics information included the number of pregnancies, gestational age, use of medication, and obstetrics pathologies such as hypertension, preeclampsia, hypothyroidism, or gestational diabetes. In addition, we asked a series of questions concerning the SARS-CoV-2 pandemic, including the following questions: *“Has the pandemic affected your pregnancy?”*, *“Have you been to the Emergency room during the pandemic?”*, *“Have you left home during the pandemic?”*, *“Are you afraid to go to the hospital?”*, *“Are you afraid that your baby could get infected?”*, *“Did you have anxiety or insomnia during the pandemic?”*. We had no missing data.

### **Specific questionnaires**

Gravids completed the SPECS for fear of childbirth, and the Hospital Anxiety and Depression Scale (HADS). The SPECS measures women’s expectations of childbirth<sup>13-14</sup>. The full scale consists of 50 items grouped as six factors, scored on a 5 point scale. ranging from 1 (strongly agree) to 5 (strongly disagree). This tool included six subscales: coping and robustness to pain (eight items), staff and service responsive to needs (11 items), fear (10 items), out of control and embarrassed (10 items), partner’s coping (six items), and positive anticipation of birth (five items). An initial assessment of psychometric robustness suggests acceptable internal reliability and good construct validity<sup>13-14</sup>. The dimensions of the SPECS reflect key areas highlighted in previous literature about the type of expectations held by women prior to giving birth, including levels of control, pain, fear, support from partners and healthcare staff, and positive anticipations of giving birth.

The HADS identifies anxiety and depressive disorders in non-psychiatric settings<sup>15</sup>, including 14 items, 7 for anxiety (odd items scored from 3 to 0), and 7 for depression (even items scored from 0 to 3). The total HADS scores may range from 0 to 21 and are obtained by summing up anxiety and depression scores. The HADS defines three ranges: 0 to 7 (noncases), 8 to 10 (doubtful cases), and 11 to 21 (cases). These cutoffs (>8 and >11) were defined based on of psychiatric ratings of anxiety and depressive disorders<sup>16</sup>. The present study used a total HADS score cutoff value of 11 or greater to identify cases.

### **Ethical considerations**

The present study was conducted following the Declaration of Helsinki and was approved by the Ethics Committee of the Torrecardenas Hospital. Participants were informed that the study was voluntary and would not have any impact on their clinical care. Participants who met the criteria of the study and who agreed to participate in the study filled an informed consent form.

## Statistical analyses

Statistical analysis was performed using the SPSS software package (version 24.0 for Windows; SPSS Inc., Chicago, IL). Data are presented as means and standard deviations, or medians and interquartile ranges [IQR]. The Kolmogorov-Smirnov test was used to determine the normality of data distribution. Non-normally distributed continuous data were compared with the Mann-Whitney *U* test or the Kruskal-Wallis test. For normally distributed continuous data, comparisons were performed with the Student's *t*-test or analysis of variance. Results are reported as mean  $\pm$  standard deviation or median and interquartile range [IQR].

We used the Spearman correlation to evaluate the associations between the SARS-CoV-2 pandemic and the HADS and SPECS Scales. Multiple linear regression analysis was performed to assess variables related to high HADS SPECS scores (dependant variable). For all calculations, a *p*-value  $< 0.05$  was considered statistically significant.

## RESULTS

During the study period, a total of 113 women accepted to participate. They were 102 caucasian (90.3%), three African Arab (2.7%), and eight Latin American (7.1%) women. The mean age of the sample was  $30.6 \pm 6.1$  years, and gestational age at survey was  $39.0 [0.7]$  weeks. A 54% were multiparous, and the median BMI was  $24.1$  [interquartile range 6.5]  $\text{kg/m}^2$ , 14.4% were smokers, there were no alcohol drinkers, and five gestations (5.5%) were obtained using assisted reproductive technics.

A 45.5% had university studies, 36.4% high school studies, and 18.2% elementary studies. There were two pregnant women with clinical symptoms of SARS-CoV-2 infection, despite that 11 had positive SARS-CoV-2 relatives. Regarding obstetrics outcomes, the cesarean delivery rate was 21.2%, with a mean foetal weight of  $3347.3 \pm 508.8$  grams and a median 5-min Apgar test score of  $10.0 [0.0]$ . The high SPECS scores were associated to increased rate of cesarean delivery ( $p = 0.043$ ). Following the Robson criteria 15,16, there were seven elective cesarean sections and six cesarean section during labor, and 11 emergency cesarean sections. They can classified according to the Robson criteria: four to the Robson group 1, ten to group 2a, one to group 2b, two to group 3, one to group 4a, and six to group 4b.

Mean SPECS and HADS scores were significantly higher in women with higher formal education levels and having SARS-CoV-2 infection during pregnancy. The mean total SPECS score was  $145.5 \pm 20.8$ . SPECS subscales scores were as follows: Pain  $23.0 [3.2]$ , Staff and service responsive to needs  $30.1 \pm 5.6$ , Fear  $31.4 \pm 6.6$ , Control and embarrassed  $29.2 \pm 7.0$ , Partner's coping  $14.7 \pm 3.7$ , and Positive anticipation of birth  $16.3 \pm 3.1$ . The highest SPECS score were in the fear and control and embarrassed subscales.

A 55.8% of gravids had high levels of anxiety and depression (HADS score > 10), and 19.5% were doubtful cases. Mean scores for HADS were significantly higher regarding the following questions (**Table 2**): “*Has the pandemic affected your pregnancy?*” ( $p < 0.0001$ ), “*Are you afraid to go to the Hospital?*” ( $p < 0.0001$ ), “*Are you afraid that your baby could get infected?*” ( $p < 0.0001$ ), and “*Have you anxiety or insomnia during the pandemic?*” ( $p < 0.0001$ ). Regarding dimensions of the SPECS, the support of healthcare staff was significantly related to the following questions: “*Has the pandemic affected your pregnancy?*” ( $p = 0.004$ ), “*Are you afraid that your baby could get infected?*” ( $p < 0.0001$ ), and “*Did you have anxiety or insomnia during the pandemic?*” ( $p = 0.001$ ). We only had two patients PCR positive SARS-CoV-2 testing since there was no program of universal screening at the time of the study. Therefore, we cannot determine the rate of asymptomatic women infected with the SARS-CoV-2.

The multiple regression analysis showed that higher the total SPECS score was positively associated with higher HADS score, non-caucasian ethnicity, and to have a positive SARS-CoV-2 serology (**Table 3**). Finally, at the time of the study, gravids were tested with specific SARS-CoV-2 PCR at admission for labor and delivery if they reported some clinical symptoms of infection. Since the small sample size, subgroup, interaction, and sensitivity analyses were not possible.

## DISCUSSION

This is the first study using the SPECS instrument to assess the fear of childbirth during the SARS-CoV-2 pandemic. We found that 113 pregnant women near term had a high rate of anxiety and depression (56.1%) linked to several SPECS items: pain, staff and service responsive to needs, fear, control and embarrassment, partner’s coping, and positive anticipation of birth. The mean score for HADS was significantly higher concerning high formal education levels and having SARS-CoV-2 infection during pregnancy. High SPECS scores were associated with high education levels, the SARS-CoV-2 infection during pregnancy, non-caucasian ethnicity, and a higher cesarean delivery rate.

The fear of childbirth is a highly prevalent problem with negative consequences on both the mother and the baby in pre-SARS-CoV-2 times. A meta-analysis estimated that it affects 14% of pregnant women in studies performed before the SARS-CoV-2 pandemic<sup>17</sup>. Pregnant women with fear of childbirth have a longer labor duration as compared with women without fear, even after adjustment for parity, labor induction, labor augmentation, analgesia, offspring birth weight, and maternal age<sup>17</sup>. On the other hand, anxiety and depression are increased in high-risk pregnancies and are associated with adverse obstetric outcomes<sup>20-21</sup>. In addition, women with high anxiety levels are more vulnerable to viral infections<sup>20-21</sup>. The present investigation suggests that the SARS-CoV-2 pandemic is associated with the risk of fear of childbirth. However, no publications used the SPECS instrument of fear childbirth before the SARS-CoV-2 pandemic to make comparisons.

There are different approaches to study fear of childbirth, including assessment during pregnancy<sup>13-14</sup> or after birth or during the puerperium<sup>24-25</sup>. Our clinical approach was based on the combination of the well-known and validated HADS<sup>13,14-26</sup> SPECS questionnaire that evaluates gravids' expectations of childbirth applied during the days or weeks before delivery. The SPECS six dimensions tool was the consequence of an exploratory analysis concerning thoughts and feelings about labor and delivery to develop realistic expectations. The instrument has been compared to other questionnaires to detect fear of childbirth in a small sample of women studied in the United Kingdom<sup>14,27</sup>. This new tool seems to include items related to fear of childbirth not previously considered in other instruments, and can be used to identify gravids at risk<sup>27</sup>. In our cohort, the tool was well accepted by both patients and healthcare providers.

During the SARS-CoV-2 pandemic, Berthelot et al.<sup>28</sup> reported more distress and psychiatric symptoms than pregnant women assessed before the pandemic, mainly in the form of depression and anxiety symptoms. Durankus et al.<sup>29</sup> found significant effects of the SARS-CoV-2 pandemic on psychology, and social isolation with the Beck Depression Inventory (BDI) and Beck Anxiety Inventory (BAI). These effects were more severe in the case patients than in the control group<sup>27</sup>. Zilver et al.<sup>29</sup> also reported a high degree of anxiety and depression during the pandemic in pregnant women living in the Netherlands, but was similar to rates of gravids studied before the pandemic, although they used a HADS cut-off  $\geq 8$  as compared to our study  $\geq 11$ . We found high levels of HADS in relation to questions related to pandemics. Lebel et al.<sup>31</sup> found that higher symptoms of depression and anxiety were associated with more concern about threats of SARS-CoV-2 to the life of the mother and baby, as well as concerns about not getting the necessary prenatal care, relationship strain, and social isolation due to the pandemic. Higher levels of perceived social support and support effectiveness, and more physical activity were associated with lower risks of psychological symptoms<sup>31</sup>. Mappa et al.<sup>32</sup> reported that the SARS-CoV-2 pandemic induces a doubling of the number of women who reached an abnormal level of anxiety. Similarly, the Hessami et al.<sup>33</sup> meta-analysis provides evidence that the pandemic was associated to increased risk of anxiety during pregnancy. Our results are consistent with that finding, where the HADS mean score was found to be related with subscale "staff and service responsive to needs" to SPECS. Ayaz et al.<sup>34</sup> reported that BMI is associated with the state of depression and anxiety. In the pre-SARS-CoV-2 era, obese gravids have more complicated pregnancies<sup>35</sup>. On the other hand, pregnant women with excessive body weight are more likely to have severe SARS-CoV-2 forms<sup>36</sup>. In our study, high scores of SPECS were related to a high cesarean delivery rate with good perinatal results since there were no differences in the Apgar test and fetal weight at birth. Revised anxiety level, depression, infertility-related stress, parental role, coping strategies, quality of life, family functioning, and clinical pregnancy rate in reproductive techniques, showed scores in the quality assessment path. Also, they mention some gender-related differences and, subsequently, possible outcomes of intervention to improve healthy reproduction

management and prevent infertility<sup>37,38</sup>. In particular, it became apparent that there was the need for an in-depth male infertility assessment and a gender-specific follow-up. Further studies are needed to confirm those issues.

### **Strengths and Limitations**

Some studies related to fear of childbirth obtained the patient information using web-based platforms, regarding only anxiety and depression during the SARS-CoV-2 pandemic<sup>39-40</sup>. Our study consisted of the administration of in-person questionnaires to assess fear of childbirth and the associated depression and anxiety status. The major limitation of this study is the small sample size due to the heavy work during the period of study in a crowded hospital. The small sample of studied gravids did not allow to study subgroups. A large population should confirm the results of this pilot study including women submitted to universal SARS-CoV-2 screening. However, emotional responses, depressive symptoms, anxiety and fear to childbirth is a general response to the uncertainty of pregnancy evolution. A second limitation is the lack of data on SPECS and anxiety and depressive symptoms in pregnancy before the pandemic to compare with our current results. Furthermore, due to the newness of this coronavirus infection, there are a lack of studies to interpret the results of the present study in pregnant women with similar conditions using the SPECS. A third limitation is that at the time of the study the vaccination on women were not started. Therefore, we are unable to obtain additional information on the maternal fear of childbirth after vaccination.

### **CONCLUSIONS**

Pregnant women at term had high SPECS scores associated with a high prevalence of depression and anxiety during the SARS-CoV-2 pandemic. Obstetrics services should implement psychological support during pregnancy and delivery to reduce the fear of childbirth. The identification of SARS-CoV-2 pandemic-related factors determining the fear of childbirth might allow designing of interventions to reduce the risk of anxiety and depression, and to improve the delivery experience. Health care providers have a delicate task to provide efficient unbiased information about health risks while still offering respect, encouragement, and support. The SPECS can be a useful tool to study the fear of childbirth in the changing Obstetric scenario, comparing pregnant women with and without SARS-CoV-2 vaccination.

### **COMPLIANCE WITH ETHICAL STANDARDS**

#### **Author contributions**

VMC, MarinaDG, AMFA and FRPL contributed to the conception of the study. AMFA, VMC, MarinaDG, MargaritaDG, GVG and CRC carried out data acquisition. All authors were involved in

the interpretation of the study results. AMFA, FRPL and VMC drafted the initial manuscript that was revised and all authors approved the final version to be published.

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### **Disclosure Interests**

The authors report no conflicts of interest and are alone responsible for the content and the writing of the article.

### **Ethical approval**

The study was approved by the Clinical Research Ethics Committee of the Torrecardenas Hospital, Almería, Spain.

### **Informed consent.**

All participants signed an informed consent.

### **Data sharing**

The present study was based on clinical results obtained during the SARS-CoV-2. pandemic.

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**Table 1.** Degree of significance ( $p$ -value) regarding different demographic characteristics and clinical factors of pregnant women at term during the SARS-CoV-2 pandemic in relation with HADS and SPECS score.

	Age	Education level	Assisted reproductive technology	Ethnicity	Parity	Smoke	BM I	SARS-CoV-2 Infection	Cesarean delivery rate	Foetal weight	5 minute Apgar test score $\geq 7$
HADS	.13	.01	.46	.82	.66	.28	.87	.02	.19	.84	.95
SPECS	.43	.02	.62	.07	.24	.31	.57	.02	.05	.46	.95

**Table 2.** Statistical significance (*p values*) of Spearman correlation tests regarding the relationships between HADS and SPECS scores and different statements related to the SARS-CoV-2 pandemic in pregnant women at term.

Question in relation to SARS CoV-2 pandemic	HADS	SPECS
Has the pandemic affected your pregnancy? Yes	< .0001	.004
Have you been to the Emergency room during pandemic? Yes	.54	.06
Have you left home during the pandemic? Yes	.22	.73
Are you afraid to go to the Hospital? Yes	< .0001	.07
Are you afraid that your baby could get infected? Yes	< .0001	.013
“Have you anxiety or insomnia in the pandemic? Yes	< .0001	.001

**Table 3.** Factors related to higher total SPECS scores among pregnant women during the SARS CoV 2 pandemic: multivariate linear regression analysis.

SPECS total score	Beta	Standard error	<i>t</i>	<i>p</i> values	B value and 95,0% CI	
					Lower limit	Upper limit
Total HADS score	-.421	.276	-4.694	< .0001	-1.847	- .749
Ethnicity	.241	2.220	2.677	.009	1.534	10.353
Positive SARS-CoV-2	.182	13.180	1.989	.05	.037	52.398
Dependent variable: total SPECS score, Adjusted R <sup>2</sup> = .307, <i>p</i> = .05						