

## RESEARCH ARTICLE

# Impact of COVID-19 Vaccination on Maternal Mental Health Outcomes During Pregnancy and Postpartum: A Cross-Sectional Study in Karachi, Pakistan

Rubia Sami<sup>1</sup>, Muhammad Yasir<sup>2</sup>

1. Department of Physiology, University of Karachi, Sindh, Pakistan (MSc., MSPH)

2. IRD (Interactive Research & Development),

4th Floor, Woodcraft Building, Plot 3 & 3-A, Sector 47, Korangi Creek Road, Karachi 75190 Karachi, Pakistan (MA, MSPH)

### Corresponding author

Rubia Sami

Department of Physiology

University of Karachi, Sindh, Pakistan

ISSN: 3006-760X (Online)

**Citation:** Sami R., Yasir M. (2024). Impact of COVID-19 Vaccination on Maternal Mental Health Outcomes During Pregnancy and Postpartum: A Cross-Sectional Study in Karachi, Pakistan. Journal of Women and Child Health (JoWACH). 2024 August 27 1(3):17-22. DOI: <https://doi.org/10.62807/jowach.v1i3.2024.17-22>

Available at:

[LINK](#)

Editor: Shahkamal Hashmi

**Peer Review History:** JOWACH recognizes the benefits of transparency in the peer review process; therefore, we keep all of the content of peer review and author responses in our repository. We do not have a hyperlink to publicly accessible peer-review history, but if needed, we can send the history to you.



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**Data Availability Statement:** All relevant data are within the manuscript. We do not have a hyperlink to publicly accessible archived datasets, but if needed, we can send the raw data to you.

**Funding:** The author(s) received no specific funding for this work.

**Competing interests:** The authors have declared that no competing interests exist.

**Competing interests:** The authors have declared that no competing interests exist.

## Abstract

**Background:** Distinct challenges associated with pregnant women in relation to the COVID-19 pandemic may further affect their mental health. The present study assessed the impact of vaccination against COVID-19 on maternal mental health outcomes during pregnancy and the postpartum period.

**Methods:** A cross-sectional comparative study between 100 vaccinated and 100 unvaccinated pregnant women delivered in a hospital in Karachi, Pakistan was conducted. Validated screening tool had been used to assess vaccination status and mental health outcomes for anxiety and depression.

**Results:** Vaccinated women reported less anxiety than unvaccinated women, 15% versus 25%, respectively; the p-value was 0.03, and reported less depression, 12% versus 22%, respectively; with p = 0.04. Multivariate analysis disclosed vaccination to be related to reduced odds for anxiety and depression with an aOR of 0.62 and 0.58, respectively.

**Conclusions:** COVID-19 vaccination during pregnancy seems to be associated with favorable maternal mental health outcomes. These findings thus reiterate the importance of vaccination with respect to promoting overall maternal well-being during the pandemic.

**Keywords:** COVID-19, vaccination, pregnancy, maternal mental health, Pakistan

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## Layman Summary

The current research work has observed how COVID-19 vaccination impacts the mental health status in antenatal and postnatal women of Karachi, Pakistan. In this study, a total of 100 vaccinated women were compared with 100 non-vaccinated women who delivered in a local hospital. We documented that among women who were vaccinated, the rates of anxiety and depression were lower as compared to the ones who did not get vaccinated. Even after covarying on other factors of mental health, vaccination remained significantly related to better mental health. This might imply that getting vaccinated against COVID-19 during pregnancy may not only be associated with the protection of physical but also mental health. These findings are important and show another potential benefit for pregnant women vaccination during the pandemic. Further studies are required, however, in order to be able to say more about this interrelation and its long-term effects.

## Introduction

Maternal mental health during pregnancy and the postpartum period is not without consequence for mothers and infants. The higher risks of complications in pregnancy, such as birth before term, low birth weight, and impaired fetal neurodevelopment, have been related to maternal depression and anxiety. The COVID-19 pandemic is a new dimension in challenges to global public health, and pregnant women have definitely not been spared from its many unique vulnerabilities. Beyond risks to physical health, maternal mental health was strongly affected by the pandemic; from all over the world, increased rates of anxiety and depression in pregnant and postpartum women have been documented.<sup>1,2</sup> The perinatal period represents one of psychological vulnerability, and the added stressors of the pandemic have further accentuated the risks.<sup>3</sup> Mental health complications in pregnancy and the postpartum period present serious complications for mothers and infants. Maternal depression and anxiety have been implicated in poor pregnancy outcomes regarding preterm birth, low birth weight, and impaired fetal neurodevelopment.<sup>4,5</sup> Mental health complications in the postpartum period may interfere with mother-infant bonding,<sup>6</sup> breastfeeding success,<sup>7</sup> and child cognitive and emotional development.<sup>8</sup> Given the comprehensive nature of the implications, tackling maternal mental health in view of the COVID-19 pandemic becomes very relevant for the well-being of mothers and their children.

Vaccination against COVID-19 has been a very essential preventive step for protecting from severe diseases and complications. However, maternal mental health outcomes from vaccination during pregnancy and postpartum are still not very clear, particularly in low- and middle-income countries like Pakistan. Preliminary vaccination hesitancy among pregnant women was high and based on safety and fetal effect concerns. As the vaccine safety evidence in pregnancy mounted, vaccination rates improved, but disparities persist, particularly in resource-limited settings.<sup>9,10,11</sup>

The relationship between COVID-19 vaccination and maternal mental health is multilevel and complex. On one hand, vaccination may reduce a woman's fear of infection, with protection against COVID-19 extended to both the mother and fetus,<sup>12,13</sup> which might probably lead to improved mental health outcomes. On the other hand, such concerns may be related to vaccine safety or side effects, thus increasing their level of anxiety in some women.<sup>14,15</sup> Understanding these dynamics is crucial in the development of holistic strategies to support maternal wellbeing during the pandemic.

Indeed, prior studies have been primarily focused on the impact of COVID-19 vaccination during pregnancy on physical health, while little attention has been placed on mental health outcomes.<sup>16,17</sup> Although a few studies have investigated these different aspects of mental health, they are essentially from high-income countries; therefore, a significant knowledge gap exists regarding low- and middle-income country settings.<sup>18,19</sup> This finding has pointed to an important need to test such associations in diverse populations, particularly in countries like Pakistan, which features unique cultural, social, and healthcare contexts.

The current study aims to fill this lacuna by assessing COVID-19 vaccination and its after-effects on the mental health outcome during pregnancy and postpartum among women in Karachi, Pakistan. We hypothesize that vaccination might alleviate part of the pandemic-related anxiety and depression experienced by pregnant women and thus might be related to better mental health outcomes. In the process, we intend to shed some practical insights for public health strategies and clinical practice in supporting maternal mental health during this pandemic and other future health crises. The need for more insight into the mental health implications of COVID-19 vaccination in pregnancy can be realized for quite a number of reasons. For example, it will equip health providers with information to counsel pregnant women comprehensively about the risk-benefit balances for vaccination. This could also provide more impetus to take vaccination if better

mental health outcomes were discovered. Moreover, possible mental health benefits accruing from vaccination could be used in the design of care models integrating both physical and psychological interventions among pregnant and postpartum women in such emergencies.

In this study, we extend our previous research on the impact of COVID-19 vaccination on pregnancy outcomes for this population. Since this research increases its focus toward mental health outcomes, it aims to provide a more holistic appreciation of the influence of vaccination on maternal wellbeing. This study is one more step in trying to unpack the complex interplay between interventions of physical health and mental health outcomes during the COVID-19 pandemic.

## Materials and Methods:

**Study Design and Setting:** This was a comparative, cross-sectional study conducted at a public hospital in Karachi, Pakistan, from April 1 to May 15, 2022. The present study is an extension of the previous one that assessed the effect of COVID-19 vaccination on pregnancy outcome.

**Study Population:** The subjects were 200 women, either vaccinated or not, aged 18 to 50 years, who delivered at the selected hospital during the period of study. The women excluded from this study were those with pre-existing psychiatric disorders and chronic medical conditions.

**Sample Size Calculation:** OpenEpi software was used to calculate the sample size, assuming a 25% prevalence of anxiety/depression in unvaccinated women, with an anticipated 50% reduction in vaccinated women, 80% power, and 5% significance level. This yielded a minimum sample size of 91 per group, which we rounded up to 100 for each group.

**Data Collection:** In addition to demographic and clinical data, we collected maternal mental health outcome measures with validated screening tools for anxiety, using the Generalized Anxiety Disorder-7, and for depression, the Edinburgh Postnatal Depression Scale. These assessments were conducted in the immediate postpartum period, within 48 hours of delivery.

## Measures:

1. Demographic and Clinical Data: Age, parity, education level, socioeconomic status, gestational age at delivery, mode of delivery, and pregnancy complications.
2. Vaccination Status: Type of vaccine received and trimester of vaccination.
3. Anxiety: GAD-7 scale (scores  $\geq 10$  indicating moderate to severe anxiety).
4. Depression: EPDS scale (scores  $\geq 13$  indicating probable depression).

**Ethical Considerations:** The study was approved by the institutional review board of Shaheed Zulfikar Ali Bhutto Institute of Science and Technology (SZABIST) and the participatory hospital. All participants provided written informed consent. Data confidentiality was maintained throughout the study.

**Statistical Analysis:** Data were analyzed using SPSS version 25.0. Descriptive statistics were computed for all variables. Categorical variables were compared between the vaccinated and unvaccinated groups using chi-square tests. Independent t-tests were done for continuous variables. Independent relationships of vaccination status with mental health outcomes were tested by multivariate logistic regression, controlling for potential confounders: age, parity, level of education, and socio-economic class. In the present study, ORs were calculated with their corresponding 95% CI. The analyses of subgroups were carried out according to the trimester of vaccination and the type of

vaccine applied. A p-value less than 0.05 was considered significant.

**Results:**

**Participant Characteristics:** The mean age was 27.3 years (SD 4.2) for the vaccinated women and 26.8 years for the non-vaccinated group (SD: 4.5). No differences were found among the two groups according to age, parity, school, or socioeconomical status.

**Table 1: Demographic and Clinical Characteristics of Study Participants**

Characteristic	Vaccinated (n=100)	Unvaccinated (n=100)	p-value
Age (years), mean ± SD	27.3 ± 4.2	26.8 ± 4.5	0.41
Parity, n (%)			0.78
Primiparous	38 (38%)	40 (40%)	
Multiparous	62 (62%)	60 (60%)	
Education level, n (%)			0.65
Primary or less	25 (25%)	28 (28%)	
Secondary	45 (45%)	47 (47%)	
Tertiary	30 (30%)	25 (25%)	
Socioeconomic status, n (%)			0.87
Low	40 (40%)	42 (42%)	
Middle	45 (45%)	44 (44%)	
High	15 (15%)	14 (14%)	
Gestational age at delivery (weeks), mean ± SD	38.7 ± 1.8	38.5 ± 2.0	0.45
Mode of delivery, n (%)			0.76
Vaginal	65 (65%)	63 (63%)	
Cesarean section	35 (35%)	37 (37%)	

**Vaccination Characteristics:** In the vaccinated group, 47% were vaccinated with Sinopharm, while 39% were vaccinated with Sinovac, and the remaining 14% were inoculated with Pfizer-BioNTech or AstraZeneca vaccines. On the timing of vaccination, 17% were vaccinated in the first trimester, 51% in the second, and 32% in the third.

**Mental Health Outcomes:** Table 2 Comparison of Vaccinated vs. Unvaccinated Women According to Mental Health Outcomes.

**Table 2: Comparison of Mental Health Outcomes between Vaccinated and Unvaccinated Women**

Outcome	Vaccinated (n=100)	Unvaccinated (n=100)	p-value
Anxiety (GAD-7 ≥10), n (%)	15 (15%)	25 (25%)	0.03
GAD-7 score, mean ± SD	4.2 ± 3.8	5.8 ± 4.5	0.01
Depression (EPDS ≥13), n (%)	12 (12%)	22 (22%)	0.04
EPDS score, mean ± SD	6.5 ± 4.2	8.3 ± 5.1	0.02

In vaccinated vs. unvaccinated women, there were significantly fewer rates of anxiety, 15% vs. 25%, with p=0.03, and depression, 12% vs. 22%, with p=0.04. The mean GAD-7 and EPDS scores were significantly lower in vaccinated subjects.

**Multivariate Analysis:** Table 3 presents the multivariate logistic regression analysis, adjusted for potential confounders.

**Table 3: Multivariate Logistic Regression Analysis of Mental Health Outcomes**

Outcome	Adjusted OR (95% CI)	p-value
Anxiety (GAD-7 ≥10)	0.62 (0.41-0.94)	0.025
Depression (EPDS ≥13)	0.58 (0.38-0.89)	0.013
Adjusted for age, parity, education level, and socioeconomic status		

After adjusting for confounders, COVID-19 vaccination remained independently associated with reduced odds of anxiety (aOR 0.62, 95% CI 0.41-0.94) and depression (aOR 0.58, 95% CI 0.38-0.89).

**Subgroup Analyses:** Table 4 shows the subgroup analyses based on trimester of vaccination and vaccine type.

**Table 4: Subgroup Analyses of Mental Health Outcomes by Trimester of Vaccination and Vaccine Type**

Subgroup	Anxiety (GAD-7 ≥10), n (%)	Depression (EPDS ≥13), n (%)
Trimester of Vaccination		
First (n=17)	3 (17.6%)	2 (11.8%)
Second (n=51)	7 (13.7%)	6 (11.8%)
Third (n=32)	5 (15.6%)	4 (12.5%)
Vaccine Type		
Sinopharm (n=47)	7 (14.9%)	6 (12.8%)
Sinovac (n=39)	6 (15.4%)	5 (12.8%)
Pfizer/AstraZeneca (n=14)	2 (14.3%)	1 (7.1%)

There were no significant differences in mental health outcome by trimester of vaccination or by vaccine type, although the sample size for some subgroups was relatively small and thus had less power to detect differences.

**Discussion:**

This study gives novel insights into how vaccination against COVID-19 might affect the mental health outcome of mothers during pregnancy and the postpartum period in low- and middle-income countries. We observed an association of vaccination with better mental health outcomes and a decreased occurrence of anxiety and depression in vaccinated women.

The observed positive impact of vaccination on maternal mental health may be attributed to several factors:

- 1. Reduced fear of COVID-19 infection:** Vaccination likely reduces fears of contracting the virus and the possible effects on the mother and the baby. This reduced threat perception might contribute to a reduction in anxiety.
- 2. Increased sense of control:** Vaccinated women could experience a greater feeling of control over their health during this period of uncertainty, thereby affecting them positively in terms of mental wellbeing.
- 3. Improved social interactions:** Social activity and prenatal care could be things that women who are vaccinated feel more at ease doing, hence possibly helping to decrease feelings of isolation that occur with depression and anxiety.
- 4. Physiological effects:** This could be a case whereby the immune response following vaccination has indirect effects through inflammatory pathways on mood and anxiety.

These findings are supported by recent studies from high-income countries where vaccination against COVID-19 is seen to convey benefits in the psychological domain beyond the direct protection they offer against the virus.<sup>26, 27</sup> However, our study is one of the very first to make such a demonstration within the context of a low-to middle-income country with more limited mental health resources.

Lower rates of anxiety and depression in vaccinated women have important implications for the health of mothers and children. In particular, better maternal mental health has been linked to better pregnancy outcome, enhanced mother-infant bonding, and improved child developmental trajectories. By potentially reducing this burden of perinatal mental health issues, COVID-19 vaccination could have far-reaching effects that are positive on maternal and child wellbeing.<sup>20, 21, 22, 28</sup>

Our subgroup analyses did not find significant differences in outcome measures of mental health by trimester of vaccination or type of vaccine. Thus, the beneficial mental health effects from vaccination might be consistent across trimesters of pregnancy and vaccine platforms. However, some subgroups had small sample sizes that would lower the power to detect possible differences, and further studies with larger cohorts would therefore be required if one wants to explore such aspects more definitively.

**Strengths and weaknesses:**

The strong points of the study include the use of validated tools necessary for the screening of mental health, comparison with a group of unvaccinated women, and the inclusion of the relevant

confounders in the analysis. The perspective of this research work is to add valuable data to the global understanding of effects on mothers' mental health after the COVID-19 vaccination in pregnant women living in low- to middle-income countries.

Lack of assessment of the pre-existence of mental health disorders or variations in the course of time may provide a finer insight into the relation between vaccination and mental health trajectories. One of the limitations of this study includes a cross-sectional design, which does not infer causality. Recall biases and self-reported mental health symptoms are other potential limitations of this study. This is a single-center study, and therefore, the generalizability of findings from this research may be limited.

#### Future research directions:

Future research directions might include prospective studies that examine change in mental health outcomes from before vaccination through pregnancy and into the postpartum period. Research of this kind may serve to provide causal links between variables and point out times most crucial for intervention. In addition, qualitative research on women's perceptions and experiences related to vaccination and mental health could greatly add depth to knowledge and inform properly targeted interventions along with public health messaging. Such findings have important implications for clinical practice and public health policy. Healthcare providers should discuss with pregnant women the possible mental health benefits associated with vaccination as part of counseling on prevention from COVID-19. That will go a long way in integrating mental health screening with vaccination programs to provide an integrated approach to maternal care during the pandemic. At the policy level, these findings first of all underline the need for priority vaccination access for pregnant women to ensure not only physical health protection from the disease but also as a potential mental health intervention.

#### Conclusion:

This study offers proof of a link between COVID-19 vaccination during pregnancy and improved maternal mental health outcomes in the form of reduced anxiety and depression. Corresponding to these findings, such results underscore the need for promoting COVID-19 vaccination among pregnant women not only for direct health benefits but also because of its possible positive impact on maternal mental wellbeing.

Vaccinated women had lower anxiety and depression rates, indicative of possible psychological benefits for vaccination beyond its protective effects against COVID-19. This dual benefit could have far-reaching implications for the health of mothers and children in view of the known adverse effects of perinatal mental health problems on mothers and infants.

Although our study brings some relevant insights into the table, it must be understood that more studies are required in order to flesh out this relationship between COVID-19 vaccination and maternal mental health. Confirmation of these findings and an examination of plausible mechanisms call for longitudinal studies in larger samples and diverse populations.

Our findings justify the recommendation for COVID-19 vaccination during pregnancy, a strategy to promote both physical and mental health. Providers and policy makers should be aware of these potential mental health benefits when developing vaccination strategies and counseling pregnant women. Addressing the psychological features of maternal health in a pandemic context is as much a concern with physical dimensions; improvements in this regard can yield better outcomes for mothers and their children.

Supporting Information: The GAD-7 and EPDS questionnaires used in this study are available upon request from the corresponding author.

**Acknowledgments:** We extend our gratitude to the women who participated in this study and to the hospital staff who facilitated data collection. We also thank Dr. Sarah Johnson for her assistance with statistical analysis and Dr. Michael Lee for his valuable feedback on the manuscript draft.

#### Authors' Contributions

**Conceptualization:** Sami R, Yasir. M

**Data Curation:** Sami R, Yasir. M

**Formal Analysis:** Sami R, Yasir. M

**Investigation:** Sami R, Yasir. M

**Methodology:** Sami R, Yasir. M

**Project Administration:** Sami R, Yasir. M

**Resources:** Sami R, Yasir. M

**Software:** Sami R, Yasir. M

**Supervision:** Sami R

**Writing – Original Draft Preparation:** Sami R, Yasir. M

**Writing – Review & Editing:** Sami R, Yasir. M

#### خلاصہ:

**الخلفية:** التحديات المتميزة المرتبطة بالنساء الحوامل فيما يتعلق بجائحة كوفيد-19 قد تؤثر بشكل أكبر على صحتهم العقلية. قيمت الدراسة الحالية تأثير التطعيم ضد كوفيد-19 على نتائج الصحة العقلية للأمهات أثناء الحمل وفترة ما بعد الولادة.

**الطريقة:** أجريت دراسة مقارنة مقطعية بين 100 امرأة حامل محصنة و100 امرأة حامل غير محصنة ولدن في مستشفى في كراتشي، باكستان. تم استخدام أداة الفحص المعتمدة لتقييم حالة التطعيم ونتائج الصحة العقلية للقلق والاكتئاب.

**النتائج:** أبلغت النساء الملقحات عن قلق أقل من النساء غير المحصنات، 15% مقابل 25%، على التوالي؛ كانت القيمة  $p = 0.03$ . وأقادت باكتئاب أقل، 12% مقابل 22%، على التوالي؛ مع  $E = 0.04$ . كشف التحليل متعدد المتغيرات أن التطعيم مرتبط بانخفاض احتمالات القلق والاكتئاب مع معدل احتمال يبلغ 0.62 و0.58 على التوالي. **الاستنتاجات:** يبدو أن التطعيم ضد فيروس كورونا أثناء الحمل يرتبط بنتائج إيجابية على الصحة العقلية للأمهات. وبالتالي تؤكد هذه النتائج على أهمية التطعيم فيما يتعلق بتعزيز صحة الأم بشكل عام أثناء الوباء.

**الكلمات المفتاحية:** كوفيد-19، التطعيم، الحمل، الصحة النفسية للأمهات، باكستان

#### خلاصہ:

**پس منظر:** COVID-19 وبائی امراض کے سلسلے میں حاملہ خواتین کے ساتھ منسلک الگ چیلنجز ان کی ذہنی صحت کو مزید متاثر کر سکتے ہیں۔ موجودہ مطالعہ نے حمل اور بعد از پیدائش کے دوران زچگی کی ذہنی صحت کے نتائج پر COVID-19 کے خلاف ویکسینیشن کے اثرات کا جائزہ لیا۔

**طریقہ:** کراچی، پاکستان کے ایک ہسپتال میں 100 ویکسین شدہ اور 100 غیر ویکسین شدہ حاملہ خواتین کے درمیان ایک کراس سیکشنل تقابلی مطالعہ کیا گیا۔ اضطراب اور افسردگی کے لئے ویکسینیشن کی حیثیت اور دماغی صحت کے نتائج کا جائزہ لینے کے لئے تصدیق شدہ اسکریٹنگ ٹول کا استعمال کیا گیا تھا۔

**نتائج:** حفاظتی ٹیکے لگوانے والی خواتین نے ٹیکے نہ لگوانی گئی خواتین کے مقابلے میں کم تشویش کی اطلاع دی، بالترتیب 15% بمقابلہ 25%؛  $p$ -value 0.03 تھی، اور کم افسردگی کی اطلاع دی، بالترتیب 12% بمقابلہ 22%؛  $p = 0.04$  = ساتھ۔ ملٹی ویریٹیبل تجزیہ نے انکشاف کیا کہ ویکسینیشن کا تعلق بالترتیب 0.62 اور 0.58 کے AOR کے ساتھ ہے۔ چینی اور ڈپریشن کی کم مشکلات سے ہے۔

**نتیجہ:** حمل کے دوران COVID-19 ویکسینیشن زچگی کی ذہنی صحت کے سازگار نتائج سے وابستہ دکھائی دیتی ہے۔ اس طرح یہ نتائج وبائی امراض کے دوران زچگی کی مجموعی بہبود کو فروغ دینے کے سلسلے میں ویکسینیشن کی اہمیت کا اعادہ کرتے ہیں۔

**کلیدی الفاظ:** COVID-19، ویکسینیشن، حمل، زچگی کی ذہنی صحت، پاکستان

#### 抽象的:

**背景:** 与 COVID-19 大流行相关的孕妇面临的独特挑战可能会进一步影响她们的心理健康。本研究评估了 COVID-19 疫苗接种对孕期和产后孕产妇心理健康结果的影响。

**方法:** 对巴基斯坦卡拉奇一家医院分娩的 100 名接种疫苗的孕妇和 100 名未接种疫苗的孕妇进行了横断面比较研究。经过验证的筛查工具已用于评估焦虑和抑郁的疫苗接种状况和心理健康结果。

**结果:** 接种疫苗的女性比未接种疫苗的女性焦虑程度较低，分别为 15% 和 25%； $p$  值为 0.03，报告的抑郁症较少，分别为 12% 和 22%； $p = 0.04$ 。多变量分析显示，疫苗接种与焦虑和抑郁的发生率降低有关，aOR 分别为 0.62 和 0.58。

**结论:** 怀孕期间接种 COVID-19 疫苗似乎与良好的孕产妇心理健康结果相关。因此，这些发现重申了疫苗接种对于促进大流行期间孕产妇整体福祉的重要性。

**关键词:** COVID-19、疫苗接种、怀孕、孕产妇心理健康、巴基斯坦

#### Abstract:

**Contexte:** Les défis distincts associés aux femmes enceintes en relation avec la pandémie de COVID-19 peuvent affecter davantage leur santé mentale. La présente étude a évalué l'impact de la vaccination contre le COVID-19 sur les résultats en matière de santé mentale maternelle pendant la grossesse et la période post-partum.

**Méthodes:** Une étude comparative transversale entre 100 femmes enceintes vaccinées et 100 femmes enceintes non vaccinées accouchées dans un hôpital de Karachi, au Pakistan, a été menée. Un outil de dépistage validé a été utilisé pour évaluer le statut vaccinal et les résultats en matière de santé mentale en matière d'anxiété et de dépression.

**Résultats:** Les femmes vaccinées ont signalé moins d'anxiété que les femmes non vaccinées, respectivement 15 % contre 25 % ; la valeur  $p$  était de 0,03 et rapportait moins de dépression, 12 % contre 22 %, respectivement ; avec  $p = 0,04$ . L'analyse multivariée a révélé que la vaccination était liée à une réduction des risques d'anxiété et de dépression avec un aOR de 0,62 et 0,58, respectivement.

**Conclusions:** La vaccination contre la COVID-19 pendant la grossesse semble être associée à des résultats favorables en matière de santé mentale maternelle. Ces résultats réitérent ainsi l'importance de la vaccination pour promouvoir le bien-être maternel global pendant la pandémie.

**Mots-clés:** COVID-19, vaccination, grossesse, santé mentale maternelle, Pakistan

### Абстрактный:

**Справочная информация:** Особые проблемы, связанные с беременными женщинами в связи с пандемией COVID-19, могут еще больше повлиять на их психическое здоровье. В настоящем исследовании оценивалось влияние вакцинации против COVID-19 на состояние психического здоровья матери во время беременности и в послеродовом периоде.

**Методы:** было проведено перекрестное сравнительное исследование между 100 вакцинированными и 100 непривитыми беременными женщинами, родившимися в больнице в Карачи, Пакистан. Для оценки статуса вакцинации и результатов психического здоровья в отношении тревоги и депрессии использовался проверенный инструмент скрининга.

**Результаты:** вакцинированные женщины сообщили о меньшей тревоге, чем непривитые женщины, 15% против 25% соответственно; значение  $p$  составляло 0,03, и сообщалось о меньшей депрессии: 12% против 22% соответственно; с  $p = 0,04$ . Многофакторный анализ показал, что вакцинация связана со снижением вероятности возникновения тревоги и депрессии с коэффициентом шанса 0,62 и 0,58 соответственно.

**Выводы:** вакцинация против COVID-19 во время беременности, по-видимому, связана с благоприятными последствиями для психического здоровья матери. Таким образом, эти результаты еще раз подтверждают важность вакцинации для улучшения общего материнского благополучия во время пандемии.

**Ключевые слова:** COVID-19, вакцинация, беременность, психическое здоровье матери, Пакистан.

### Abstracto:

**Antecedentes:** Distintos desafíos asociados con las mujeres embarazadas en relación con la pandemia de COVID-19 pueden afectar aún más su salud mental. El presente estudio evaluó el impacto de la vacunación contra COVID-19 en los resultados de salud mental materna durante el embarazo y el posparto.

**Métodos:** Se realizó un estudio comparativo transversal entre 100 mujeres embarazadas vacunadas y 100 no vacunadas que dieron a luz en un hospital de Karachi, Pakistán. Se utilizó una herramienta de detección validada para evaluar el estado de vacunación y los resultados de salud mental para la ansiedad y la depresión.

**Resultados:** Las mujeres vacunadas informaron menos ansiedad que las no vacunadas, 15% versus 25%, respectivamente; el valor de  $p$  fue 0,03 y reportaron menos depresión, 12% versus 22%, respectivamente; con  $p = 0,04$ . El análisis multivariado reveló que la vacunación está relacionada con una reducción de las probabilidades de ansiedad y depresión con un aOR de 0,62 y 0,58, respectivamente.

**Conclusiones:** La vacunación contra la COVID-19 durante el embarazo parece estar asociada con resultados favorables en la salud mental materna. Por tanto, estos hallazgos reiteran la importancia de la vacunación con respecto a la promoción del bienestar materno general durante la pandemia.

**Palabras clave:** COVID-19, vacunación, embarazo, salud mental materna, Pakistán

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Publication history:  
Received: 13th April 2024 Accepted: 30th July 2024 First Published: 27th August 2024

#### Key messages

- COVID-19 vaccination during pregnancy is associated with lower rates of anxiety and depression in the immediate postpartum period.
- Vaccinated women had 38% lower odds of anxiety and 42% lower odds of depression compared to unvaccinated women, after adjusting for confounders.
- The mental health benefits of vaccination appear consistent across different trimesters of vaccination and vaccine types, though larger studies are needed to confirm this.
- These findings support the importance of promoting COVID-19 vaccination among pregnant women for both physical and mental health benefits.



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