

Original Research Article

Assessment of COVID-19 vaccine hesitancy among the pregnant women: a mixed-method study from field practice area of Sagar, Madhya Pradesh

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ABSTRACT

Background: The World Health Organization defines vaccine hesitancy as a “delay in acceptance or refusal of safe vaccines despite availability of vaccine services”. While pregnancy does not inherently increase susceptibility to COVID-19, pregnant women face higher risks of severe illness if infected. Misconceptions during the crucial antenatal care period contribute to vaccine hesitancy. This study aimed to assess COVID-19 vaccine hesitancy among pregnant women in Sagar, Madhya Pradesh.

Methods: A mixed-method study was conducted using multistage random sampling. The study involved 70 unvaccinated pregnant women from the field practice area of Polyclinic Chameli Chowk and in-depth interviews with 17 key informants, including district immunization officers, vaccination officers, and health care workers. Inclusion criteria were unvaccinated pregnant women under 50 years, willing to participate, and without contraindications for COVID-19 vaccination. Data collection tools included a pre-tested semi-structured questionnaire for quantitative data and a question guide for qualitative data.

Results: Among the 70 unvaccinated pregnant women, 49 (70%) were primigravida, and 21 (30%) were multigravida. A significant majority, 57 (81.3%), were unemployed (housewives). Vaccine hesitancy was identified in 66 (94.2%) women, while 4 (5.7%) were resistant to vaccination.

Conclusions: The study highlights the importance of communication from trusted sources, easy access to vaccines, and community engagement in addressing vaccine hesitancy among pregnant women. The findings suggest targeted interventions to reduce hesitancy and ensure timely mass immunization against COVID-19.

Keywords: Antenatal care, COVID-19, Hesitancy, Mixed-method study, Pregnancy, Public health, Resistant

INTRODUCTION

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus that causes COVID-19, reached pandemic status on March 11th, 2020.¹ The SARS CoV2 pandemic has disrupted the life of people globally.² Unlike other medicines, vaccines work at both the individual and community level. While no vaccine is 100% effective, when used broadly in communities, several vaccine preventable diseases could be eliminated

and some may be eradicated. High vaccine uptake rates, specific to each vaccine preventable disease, are needed for community-level immunity to be achieved and sustained in order that disease risk can be lowered beyond what would be predicted by vaccine coverage alone.³

It is one of the most successful and cost-effective interventions to improve health outcomes. Vaccines have saved countless lives and improved health and well-being around the globe. However, to prevent the morbidity and

mortality associated with vaccine preventable diseases and their complications, and optimize control of vaccine preventable diseases in communities, high uptake rates must be achieved. As the complacency, convenience and confidence (“3Cs”) model of vaccine hesitancy determinants succinctly categorized many factors it was embedded in the definition. Concerns about vaccine safety may be associated with vaccine hesitancy. However, it is important not to equate vaccine hesitancy and vaccine safety. Safety is only one driver of vaccine hesitancy. Nevertheless, in situations where vaccine safety is one of the underlying causes of vaccine hesitancy, using appropriate best practices to address concerns over adverse events following immunization, can minimize the potential negative impact that may result. Communication is a key tool for success of any immunization program but is not a specific determinant in vaccine hesitancy. However, inadequate or poor communication about vaccines (e.g., why they are recommended and their safety and effectiveness) can contribute to vaccine hesitancy.³ Vaccination is the one of the prime weapons against the COVID pandemic. But the overall challenge is to vaccinate the large population and to regulate the demand and supply of vaccine to fulfil the requirement. And it becomes imperative that there should be judicious use and equitable distribution of vaccine. Pregnancy does not increase the risk to COVID-19 infection, but current evidence indicate that pregnant women are at an increased risk for severe illness from COVID-19 compared to non-pregnant women in case they get infected.⁴⁻⁶ Mass vaccination is the need of the hour to abate the third wave. Hence it is important to immunize all the high-risk group including pregnant women. As the ANC period is crucial period of motherhood, there are some obscure notions which led to vaccine hesitancy. Vaccine hesitancy refers to delay in acceptance or refusal of vaccination despite availability of vaccination services, has been recognized by the World Health Organization (WHO) as one of the biggest current threats to global public health.⁷⁻⁸ Vaccine hesitancy is complex and multifaceted. Many factors influence vaccine-decision making, including cultural norms, social and peer influences, political views, and other factors that are specific to an individual or group, as well as concerns regarding specific vaccines.⁹ Vaccine hesitancy may also be related to misinformation and conspiracy theories which are often spread online, including through social media.¹⁰ Vaccine hesitancy occurs on the continuum between high vaccine demand and complete vaccine refusal i.e. one who is not demanding available and offered vaccines, but rather is equivocal about ever receiving some or all vaccines in accordance with the recommended schedule. Vaccine-hesitant individuals are a heterogeneous group who hold varying degrees of indecision about specific vaccines or vaccination in general. Vaccine-hesitant individuals may accept all vaccines but remain concerned about vaccines, some may refuse or delay some vaccines but accept others; some individuals may refuse all vaccines.¹¹ Vaccine hesitancy is widely recognised as one of the most serious threats to

current global health.¹² Negative attitudes towards vaccines and an uncertainty or unwillingness to receive vaccinations are major barriers to managing the COVID-19 pandemic in the long-term.¹³ Vaccine acceptance among the general public and healthcare workers appears to have a decisive role in the successful control of the pandemic.¹⁴ Vaccine hesitancy is waning, yet inequities in receipt remain. There is a clear public health opportunity to convert higher vaccine willingness into successfully delivered vaccinations.¹⁵ The aim of the study was to assess the vaccine hesitancy in pregnant women of Sagar. And by this study we will recommend measures to reduce it so, that the mass immunization will be completed as early as possible and we combat this situation without delay.

Aims and objectives

To assess the various factors causing COVID-19 vaccine hesitancy in pregnant women. To give the appropriate recommendation for reduction of vaccine hesitancy.

METHODS

This was a mixed-method type of study.

Study population

In this study we have included 17 participants (1 nodal vaccination officer, 1 vaccination officer and HCWs (13 ASHA, 1 ANM and 1 counsellor) and, 70 unvaccinated pregnant women were also included who were willing to participate and were well oriented and had no medical contraindicated condition for COVID vaccine

Sampling procedure

For quantitative component we had used multistage random sampling. From field practice area (Chameli chowk) 7 Anganwadi centers were selected randomly through lottery system and from each Anganwadi center a random selection of 10 unvaccinated pregnant women was done and those 10 pregnant women (those were registered for ANC but haven't taken COVID-19 vaccine were interviewed by visiting them door-to-door with the help of ASHA

For qualitative component in-depth interviews were conducted and we had interviewed nodal vaccination officers, vaccination officers and health care workers working in field practice area. All the study subjects were explained about the nature and reason for the study and they can withdraw from the study anytime.

Inclusion criteria

Pregnant females aged less than 50 years, who were willing to participate in the study and giving written consent. Participant should be well oriented for person, place and time.

Exclusion criteria

Pregnant women having contraindicated condition for COVID vaccination.

Sample size

17 participants [1 nodal vaccination officer, 1 vaccination officer and HCWs (13 ASHA, 1 ANM and 1 counsellor)]. 70 Unvaccinated pregnant women.

Data collection tool

For quantitative components a semi-structured questionnaire was used. For qualitative components a question guide was used.

Data analysis

Quantitative data analysis was done using MS Excel software which presents the descriptive analysis of

percentages and proportion while the qualitative data was analyzed using NVivo 14 version.

Ethical consideration

Ethical approval on 28/10/2021, IECBMC/2021/49 and data collection has been done for 28/10/21 to 28/01/22 period after the ethical approval.

RESULTS

The study involved 70 pregnant women. The majority were aged 20-25 years (65.71%) and had completed middle school (31.43%). Most were unemployed or homemakers (81.43%). There was no significant association between age, education, occupation, or parity with vaccine hesitancy, suggesting that these factors did not differentially influence vaccine acceptance among the study population. Of the 70 pregnant women included in the study, 66 (94.2%) exhibited vaccine hesitancy, while 4 (5.7%) were resistant to vaccination (Table 1).

Table 1: Sociodemographic profile of pregnant women in the study area.

Variable	Category	Frequency	Percentage
Age in year	≤19	5	7.14
	20-25	46	65.71
	26-31	16	22.86
	32-37	2	2.86
	≥38	1	1.43
Educational status	Primary school certificate	20	28.57
	Middle school certificate	22	31.43
	High school certificate	8	11.43
	Intermediate or post high school diploma	15	21.43
	Graduate or post graduate	3	4.29
	Profession or honours	3	4.29
Occupation	Unemployed/homemaker	57	81.43
	Unskilled worker	8	11.43
	Semiskilled worker	4	5.71
	Skilled worker	7	10.00
	Clerical, shop owner, farmer	2	2.86
Gravidity	Primigravida	49	70.00
	Multigravida	21	30.00

Factors shaping vaccine hesitancy

Quantitative findings revealed high levels of vaccine hesitancy among the study participants. A significant proportion expressed concerns about the pharmaceutical industry (30%), politicians and policymakers (60%), and rumors (80%). Additionally, many women perceived higher risks than benefits associated with the vaccine (75.7%) and were influenced by family and community members' experiences (64.3%) (Table. 2).

Qualitative data provided deeper insights into these quantitative findings. The themes of avoidance, behavior, and cognition and sub-theme for avoidance as convenience, confidence, complacency emerged as key determinants of vaccine hesitancy (Table 3).

Avoidance was primarily related to logistical challenges like vaccine shortages and cumbersome registration processes. This aligns with the high percentage of women influenced by rumors and talk of the town, suggesting a lack of accessible and reliable information.

Table 2: Factors shaping vaccine hesitancy among pregnant women in Sagar, Madhya Pradesh.

Variables	Question asked	Pregnant women responding yes	Percentage
Contextual influences- influences arising due to historic, socio-cultural, environmental, health system/ institutional, economic or political factors	Whether communication and media environment (radio, print media, digital media) influence your decision	0	0.0
	Is there any religion and culture influence	0	0.0
	Are there any geographic barriers causing difficulty to reach for vaccination	0	0.0
	Whether Influential leaders, immunization programme gatekeepers and anti- or pro-vaccination lobbies influence your decision	5	7.1
	Do you have trust issue with the pharmaceutical industry supplying vaccines	21	30.0
	Do you trust issue with politicians and policies makers	42	60.0
	Whether rumours and talk of town influence your decision	56	80.0
Individual and group influences- Influences arising from personal perception of the vaccine or influences of the social/peer environment	Do you think government is forcing you for COVID vaccination	16	22.9
	Do you have trust issue with the health system and providers	19	27.1
	Whether your family and/or community members' experience with vaccination, including pain, fever discourage you to get vaccinated?	45	64.3
	Do you think there is more risk and less benefit (perceived, heuristic) by COVID vaccine	53	75.7
	Do you believe that COVID vaccine can prevent COVID-19.	54	77.1
	Do you have knowledge/awareness about COVID vaccination	70	100.0
Vaccine/ vaccination-specific issues directly related to vaccine or vaccination	Do you doubt the reliability and/or source of supply of vaccine and/or vaccination equipment	10	14.3
	Does the mode of administration influence your decision to take vaccination	12	17.1
	Introduction of a new vaccine or new formulation or a new recommendation for an existing vaccine	13	18.6
	Does the design of vaccination programme(registration)/mode of delivery (e.g., routine programme or mass vaccination campaign) influence your decision	14	20.0
	Does vaccination schedule (double dose and time duration) influence your decision	42	60.0

Table 3: Emerging themes related to COVID-19 vaccine hesitancy among pregnant women.

Theme	Subtheme	Statement
Avoidance	Convenience	"No difficulty in place but due to shortage of vaccine, mother have to wait in long queue and registration is a cumbersome process". (CP-10)
	Confidence	"Pregnant women are having fear of pain, fever and miscarriage". (CP-9) "They have trust issue with risk and efficacy of vaccine". (CP-13)
	Complacency	"Due to prevalence of COVID-19 in those who previously got vaccinated they think they don't need it". (CP-3)
Behaviour		"It is getting more difficult to convince pregnant women for vaccination but as the community shows acceptance for vaccine they will also start following for the same". (CP-4) "Most of them prefer to wait for their peers to see their reactions and reviews, but nobody wants to volunteer". (CP-7)
		"Pregnant women have knowledge/awareness about COVID-19, COVID-19 vaccination, and CAB but due to rumors and myths in the community they are indecisive". (CP-12)

Cognition highlighted the presence of knowledge about COVID-19 and vaccination but also the impact of misinformation and rumors in creating indecision. This aligns with the significant number of women influenced by rumors and talk of the town.

Key findings and implications

The integrated analysis underscores the complex interplay of factors contributing to vaccine hesitancy among pregnant women. While sociodemographic factors did not significantly influence hesitancy, a combination of logistical challenges, safety concerns, misinformation, and social pressures emerged as key determinants.

These findings highlight the need for targeted interventions addressing specific concerns, such as improving vaccine accessibility, building trust in healthcare systems and pharmaceutical industries, and countering misinformation through effective communication strategies. Additionally, addressing social norms and peer influence through community-based initiatives may be crucial in promoting vaccine acceptance among pregnant women.



Figure 1: Word cloud: unmasking vaccine hesitancy.

DISCUSSION

The findings of this study align with the broader body of research highlighting the prevalence and complexity of COVID-19 vaccine hesitancy among pregnant women.

Concerns about vaccine safety and efficacy emerged as the most common reasons for hesitancy, echoing the findings of previous studies.^{11,17,18} The rapid development of COVID-19 vaccines and the lack of comprehensive safety data during early stages of vaccination campaigns exacerbated these concerns.^{19,20}

Similar to other studies, this research underscores the role of misinformation and rumours in shaping vaccine hesitancy.²¹⁻²³ The influence of social media and informal information networks in disseminating inaccurate or misleading information about vaccine safety cannot be overstated.

Furthermore, the study's findings reinforce the importance of addressing contextual factors influencing vaccine hesitancy. The impact of socio-cultural, economic, and healthcare system-related factors, as highlighted by Razai et al, is evident in the qualitative data on avoidance and accessibility issues.¹¹

The concept of the “five Cs” framework (confidence, complacency, constraints, calculation, and collective responsibility) proposed by Betsch et al provides a useful lens for understanding the multifaceted nature of vaccine hesitancy.²² The themes of avoidance, confidence, and complacency observed in the qualitative data align with these constructs, emphasizing the need for tailored interventions addressing different aspects of hesitancy.

While the present study did not find significant associations between sociodemographic factors and vaccine hesitancy, previous research has identified disparities in vaccine acceptance based on factors such as age, education, and socioeconomic status.^{20,23} These findings highlight the importance of equity-focused approaches to vaccine promotion and addressing the specific needs of vulnerable populations.

In conclusion, this study contributes to the growing body of evidence on COVID-19 vaccine hesitancy among pregnant women. The findings underscore the need for comprehensive interventions addressing vaccine safety concerns, improving access to accurate information, and building trust in healthcare systems. Tailored strategies addressing specific subgroups and leveraging social networks can be effective in promoting vaccine uptake and mitigating the impact of misinformation.

This study has several limitations. The sample size was relatively small, with only 70 pregnant women included, which may limit the generalizability of the findings to broader populations. Additionally, the study focused on a specific geographic region (Sagar district), and local socio-cultural factors may not be representative of other regions. The reliance on self-reported data introduces the possibility of response bias, where participants may not have fully disclosed their true beliefs or behaviors regarding vaccination. Lastly, the study did not account for potential changes in attitudes over time, as vaccine

hesitancy may evolve with new information or experiences.

CONCLUSION

This study highlighted the multifaceted nature of COVID-19 vaccine hesitancy among pregnant women in Sagar district, Madhya Pradesh. While sociodemographic factors played a limited role, concerns about vaccine safety, accessibility, and misinformation emerged as key determinants. To address these barriers and increase vaccine acceptance, targeted interventions are essential. These include improving vaccine accessibility, enhancing communication about vaccine safety, countering misinformation through effective public health campaigns, strengthening community-based initiatives, and providing comprehensive training for healthcare providers. Additionally, engaging religious leaders, celebrities, and mass media, integrating COVID-19 vaccination with regular maternal and child healthcare services, and mandating vaccinations with appropriate sanctions can further contribute to increasing vaccination rates. By addressing these factors, policymakers and healthcare providers can work towards protecting the health of pregnant women and their children.

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REFERENCES

- Murphy J, Vallières F, Bentall RP, Shevlin M, McBride O, Hartman TK, et al. Psychological characteristics associated with COVID-19 vaccine hesitancy and resistance in Ireland and the United Kingdom. *Nat Commun*. 2021;12:29.
- Danabal KGM, Magesh SS, Saravanan S, Gopichandran V. Attitude towards COVID 19 vaccines and vaccine hesitancy in urban and rural communities in Tamil Nadu, India- a community based survey. *BMC Health Serv Res*. 2021;21(1):994.
- Report of the Sage working group on vaccine hesitancy. Available from: https://www.asset-scienceinsociety.eu/sites/default/files/sage_working_group_revised_report_vaccine_hesitancy.pdf. Accessed on 27 November 2021.
- CounsellingbookletforFLWsEnglish.pdf. Available from: <https://main.mohfw.gov.in/Organisation/Departments-of-Health-and-Family-Welfare/immunization/aei-reports>. Accessed on 14 March 2022.
- COVID-19 and pregnancy: vaccine hesitancy and how to overcome it. *BMJ*. 2021;375:n2862.
- Goruntla N, Karisetty B, Nandini N, Bhupasamudram B, Gangireddy HR, Veerabhadrapa KV, et al. Adverse events following COVID-19 vaccination among pregnant women attending primary health centers: An active-surveillance study. *Vacunas*; 2023. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10192595/>. Available on 25 September 2024.
- Dubé E, Gagnon D, Nickels E, Jeram S, Schuster M. Mapping vaccine hesitancy- country-specific characteristics of a global phenomenon. *Vaccine*. 2014;32(49):6649-54.
- MacDonald NE, SAGE Working Group on Vaccine Hesitancy. Vaccine hesitancy: Definition, scope and determinants. *Vaccine*. 2015;33(34):4161-4.
- ASPE predictions of vaccine hesitancy for COVID-19 vaccines by geographic and sociodemographic features. Available from: <https://aspe.hhs.gov/sites/default/files/private/pdf/265341/vaccine-hesitancy-COVID-19-Methodology.pdf>. Accessed on 15 March 2022.
- Razai MS, Chaudhry UAR, Doerholt K, Bauld L, Majeed A. COVID-19 vaccination hesitancy. *BMJ*. 2021;n1138.
- Troiano G, Nardi A. Vaccine hesitancy in the era of COVID-19. *Public Health*. 2021;194:245-51.
- Siani A, Driscoll M, Hurst TM, Coker T, Grantham AG, Bunet A. Investigating the determinants of vaccine hesitancy within undergraduate students' social sphere. *J Public Health*. 2021;1-9.
- Paul E, Steptoe A, Fancourt D. Attitudes towards vaccines and intention to vaccinate against COVID-19: Implications for public health communications. *Lancet Reg Health Eur*. 2021;1:100012.
- Sallam M. COVID-19 vaccine hesitancy worldwide: a concise systematic review of vaccine acceptance rates. *Vaccines*. 2021;9(2):160.
- Siegler AJ, Luisi N, Hall EW, Bradley H, Sanchez T, Lopman BA, et al. Trajectory of COVID-19 vaccine hesitancy over time and association of initial vaccine hesitancy with subsequent vaccination. *JAMA Network Open*. 2021;4(9):e2126882.
- Larson HJ, Jarrett C, Schulz WS, Chaudhuri M, Zhou Y, Dube E, et al. Measuring vaccine hesitancy: the development of a survey tool. *Vaccine*. 2015;33(34):4165-75.
- Goncu Ayhan S, Oluklu D, Atalay A, Menekse Beser D, Tanacan A, Moraloglu Tekin O, et al. COVID-19 vaccine acceptance in pregnant women. *Int J Gynecol Obstet*. 2021;154(2):291-6.
- Mohan S, Reagu S, Lindow S, Alabdulla M. COVID-19 vaccine hesitancy in perinatal women: a

- cross sectional survey. *J Perinat Med*. 2021;49(6):678-85.
19. Berry SD, Johnson KS, Myles L, Herndon L, Montoya A, Fashaw S, et al. Lessons learned from frontline skilled nursing facility staff regarding COVID-19 vaccine hesitancy. *J Am Geriatr Soc*. 2021;69(5):1140-6.
 20. Kiefer MK, Mehl R, Costantine MM, Johnson A, Cohen J, Summerfield TL, et al. Characteristics and perceptions associated with COVID-19 vaccination hesitancy among pregnant and postpartum individuals: a cross-sectional study. *BJOG*. 2022;129(8):1342-51.
 21. Hosokawa Y, Okawa S, Hori A, Morisaki N, Takahashi Y, Fujiwara T, et al. The prevalence of COVID-19 vaccination and vaccine hesitancy in pregnant women: an internet-based cross-sectional study in Japan. *J Epidemiol*. 2022;32(4):188-94.
 22. Ransing R, Kukreti P, Raghuveer P, Puri M, Paranjape AD, Patil S, et al. A brief psycho-social intervention for COVID-19 vaccine hesitancy among perinatal women in low-and middle-income countries: need of the hour. *Asian J Psychiatr*. 2022;67:102929.
 23. Kumari A, Mahey R, Kachhawa G, Kumari R, Bhatla N. Knowledge, attitude, perceptions, and concerns of pregnant and lactating women regarding COVID-19 vaccination: a cross-sectional survey of 313 participants from a tertiary care centre of north India. *Diabetes Metab Syndr Clin Res Rev*. 2022;16(3):102449.

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