

## Research Article

### COVID-19 Vaccine Uptake and Hesitancy among Pregnant Women in Developing Countries

Zaid Ali Nasir<sup>1</sup>, Zulqarnain Shahid<sup>2</sup>, Zawar Ahmad Dar<sup>3</sup>, Saleha Haider<sup>4</sup>, Zain ul Abideen<sup>5</sup>, Mahnoor Khan<sup>6</sup>, Athar Ahmed Saeed<sup>7</sup>, Saira Afzal<sup>8</sup>

<sup>(7)</sup>Queen Elizabeth Hospital, Gateshead, United Kingdom

<sup>(1-6)</sup>King Edward Medical University/ Mayo Hospital, Lahore <sup>(8)</sup>King Edward Medical University/ Mayo Hospital, Lahore.

#### ABSTRACT:

**Background:** Covid-19 has posed various health challenges all over the world. Pregnant ladies are a major part of the society affected by this viral infection. In the spreading of the virus, vaccination is the best precautionary measure. However, many pregnant women in developing countries are reluctant to uptake the vaccine as they believe it can affect the health of their fetus. This is due to the lack of information and knowledge regarding the safety of vaccines.

**Objective:** Identifying the factors that influence pregnant women in developing nations' low vaccination rates for the COVID-19 vaccine and estimating the proportion of these women who are hesitant to receive the vaccine are the objectives.

**Methodology:** We performed a systematic review using the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) on PUBMED and GOOGLE SCHOLAR, specifically using peer-reviewed articles examining risk factors for suicidal thoughts and attempts in transgender people. Articles that were imported in Zotero were 1090. After excluding three duplicates, the remaining articles were screened based on titles and abstracts, and then full-text availability criteria were applied. Applying inclusion and exclusion criteria provides the final articles selected for our research analysis. Seven papers were selected to study risk factors for suicidal ideation and suicidal attempts.

**Results:** Seven papers were selected out of 1900 articles from search criteria. Out of these, four are based in Pakistan, two studies were conducted in Nepal, and 1 in south India. The age range of participants was 16-62 years of age. The total number of participants in the included six studies is 1559, and one used a non-probability sampling technique. All the factors that contributed to a high prevalence of suicidal ideation and suicidal attempts in transgender are highlighted.

**Conclusions:** The reluctance of vaccine uptake in expecting women was found relatively high in developing countries. This is because of many socioeconomic factors including domestic pressure, social myths about vaccination, lack of knowledge, fear of risks, etc. This also depicts the necessity of intervention required for proper guidance and counseling of pregnant women as well as their families.

**Corresponding Author:** Mahnoor Khan PGR | **Email:** [noooremah162@gmail.com](mailto:noooremah162@gmail.com)

**Supervisor:** Prof. Dr. Saira Afzal | King Edward Medical University/ Mayo Hospital, Lahore.

**Email:** [sairamust@gmail.com](mailto:sairamust@gmail.com)

**Key Words:** Vaccine hesitancy, COVID-19.

## INTRODUCTION:

COVID-19 first appeared in a city in China Wuhan and then spread throughout the world. Soon it was declared a pandemic and has posed havoc to global health with high rates of extremely fatal consequences<sup>1</sup>. It is a highly contagious viral ailment caused by severe acute respiratory syndrome corona-virus. It has caused an expected 15 million deaths to date<sup>2</sup>. Clinicians have been combating the new ailment and engaged in finding effective treatments that may lead to better survival outcomes. Vaccination has been a major tool for healthcare workers all over the world for preventing COVID-19 infection and reducing mortality rates. There was a total reduction of 79% in deaths by vaccination<sup>3</sup>. Hence it has become evident that an enhanced vaccination rate is the key to boosting the general immunity of people worldwide and a major strategy to combat the pandemic.

Pregnant women are more endangered by infection of COVID-19 resulting in respiratory distress and posing a threat to the life of the fetus with increased risk of low birth weight, preterm birth, preeclampsia, and still-birth<sup>4</sup>. Moreover, there are high evidence of transmission of infection from mother to fetus with rate of transmission equal to other pathogens causing congenital infection, resulting in birth of covid infected children with higher incidence of pneumonia<sup>5</sup>. Despite having higher destructive effects of covid, pregnant women have higher reluctance and low acceptance rate to vaccination as compared to their non-pregnant counterparts in developing countries like Pakistan where health system is not of higher standards for intensive care of infected pregnant ladies<sup>6</sup>. Pakistan has very low

vaccine acceptance rate in expecting women<sup>7</sup>.

Major factors compounding this increased hesitancy rate are familial pressure and risk to pregnancy. Among one of the reasons for increased hesitancy and low rate of acceptance of mass vaccination in developing countries is spread of fake news at social media platforms. The wrong narrative of people regarding use of vaccines among pregnant women of developing countries is because of the reason that pregnant women could not be enrolled in any scientific study on effects of vaccine because of ethical issues. Due to a lack of statistical data people have come up with many superstitions about the adverse effects of vaccines at peak of the pandemic which has ultimately enhanced the hesitancy among people for vaccination creating a barrier for combating enhanced infection rates<sup>8</sup>. This study intends to examine the underlying factors of high reluctance for vaccination among pregnant ladies in developing countries and to determine the rate of vaccine hesitancy in pregnant ladies of developing countries.

## MATERIALS AND METHODS:

A Systematic review was conducted. Systematic reviews are articles that integrate information from various research articles about a particular subject to synthesize data and assert the significance of results and are a great means to stay updated with recent developments as well as use them as guidelines in medical practice. The review was conducted by the Preferred Reporting Items for Systematic Review and Meta-analysis (PRISMA) guidelines.

The systematic review will include studies that are published in English language between the years 2019 and 2023, focus on pregnant women in middle or low

income countries, examine the determinants of low acceptance and hesitancy in uptake of covid-19 vaccine and employ qualitative or quantitative research techniques include randomized controlled trials, and cross-sectional studies etc.

The studies that are not in English language and will be excluded. The studies carried out in high income countries will not be included in the review. The studies carried on the non-pregnant women will also be excluded. The articles that are not accessible or require subscription for access to complete articles were excluded.

Research databases like Google scholar and PubMed were used to get 111 relating articles from 2019-2023 which were screened through exclusion criteria. Searches were done in March and April 2023. The search strategy used was Covid-19, Vaccine Hesitancy, Pregnant Women. Developing country's names were used individually. AND OR operations were used.

The articles obtained using the search strategy were 111 in number. All five researchers did the screening process. After excluding all duplicate articles, 70 articles were selected. They were further screened based on exclusion and inclusion criteria and 10 articles were selected for data extraction.

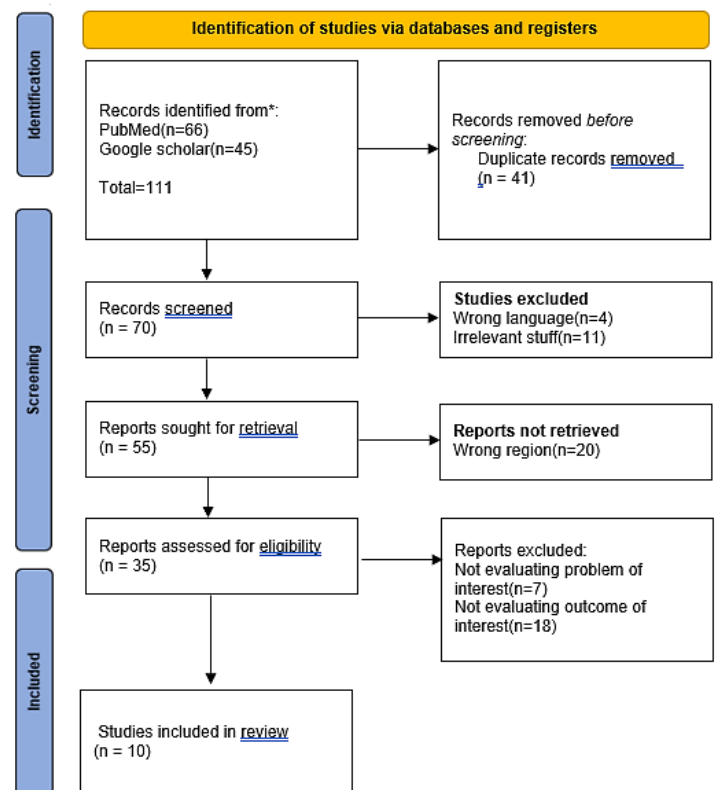
The data of some selected articles was derived out by five researchers. Percentage of unwillingness for vaccination among pregnant ladies, factors determining vaccine hesitancy, year of study, country of the study, and sample size were recorded.

## RESULTS:

Out of 111 studies found, 41 were found duplicated and removed. By using our research criteria 70 articles

were studied and 10 studies were selected for data extraction.

The mean of percentage hesitancy regarding the uptake of Covid-19 vaccine was found to be 55.74%. Factors affecting rate of vaccine hesitancy include possibility of harm to both the mother and the baby, lack of knowledge, uncertainty about vaccine safety and efficacy, fear of risk of self-infection by vaccine, family pressure, history of earlier reproductive illnesses and inaccessibility to vaccines.



**Figure1: Identification of study**

The 10 articles selected for the review included seven cross-sectional studies, one mixed method study and one multicentric survey. All of them discussed the percentage of reluctance in expecting ladies and factors affecting vaccine uptake. Forest plot and graph representing this data is as follow.

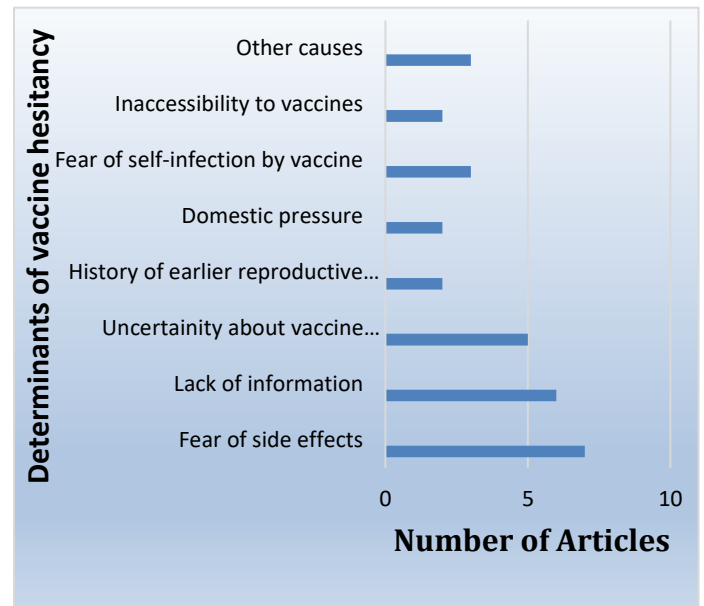
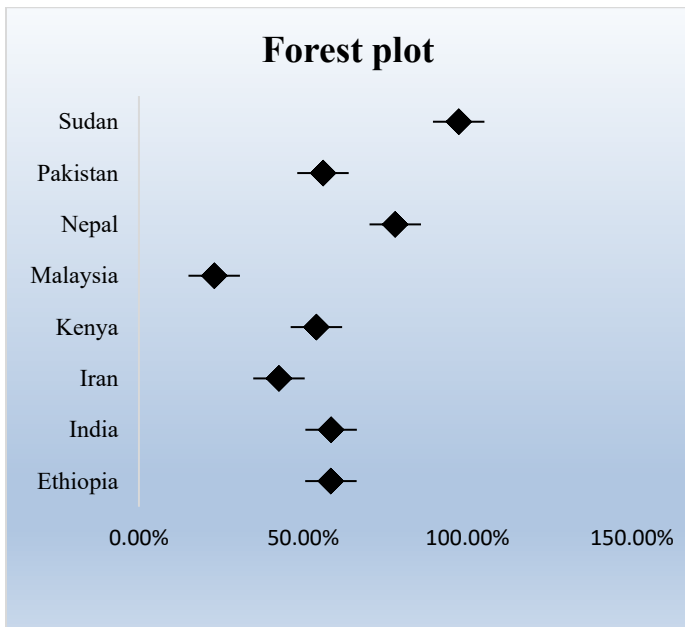


Figure 2: Showing Covid 19 vaccine Hesitancy in pregnant ladies.

Figure 3: Determinants of vaccine hesitancy.

Table 1: Data Extraction Table

Sr. No.	Author, Year & Ref no.	Title	Study Type	Region	Sample size	Results	Determinants of Vaccine Hesitancy
1	Getachew T. et al, 2022 <sup>9</sup>	COVID-19 vaccine acceptance among pregnant women attending antenatal care in public hospitals in eastern Ethiopia: A multi-center facility-based cross-sectional study.	Cross-sectional study	Eastern Ethiopia	645	Vaccine hesitancy was 37.8% (n=244).62.2% were willing to be vaccinated	Fear of side effects to mother and baby. Lack of information. Uncertainty about vaccine safety. Uncertainty about vaccine efficacy
2	Firouzbakht M. et al, 2022 <sup>10</sup>	Hesitancy about COVID-19 vaccination among pregnant women: a cross-sectional study based on the health belief model	Cross-sectional study	Iran	352	42.61%(n=150) had hesitancy about uptake of covid vaccine.	Fear of side effects and complications. Perceived benefits or threats. Cues to action. History of earlier reproductive comorbidity
3	Marwa M. M. et al, 2023 <sup>11</sup>	COVID-19 vaccine hesitancy among pregnant and postpartum Kenyan women	Observational study	Kenya	235	54%(n=127) had hesitancy about uptake of Covid vaccine.	Lack of knowledge. Lack of trust on data provided by state on vaccine. Lack of trust on healthcare system.

4	Niranjjan R. et al, 2023 <sup>12</sup>	COVID-19 Vaccine Hesitancy Among Pregnant and Lactating Mothers Attending Government Health Care Centers in Karaikal, South India	Cross-sectional study	Karaikal South India	904	55% (n=497) women were hesitant about uptake of Covid vaccine	Possibility of harms to mother and baby. Domestic pressure
5	Kalok A. et al, 2023 <sup>13</sup>	Maternal COVID-19 vaccine acceptance among Malaysian pregnant women: A multicenter cross-sectional study	Cross-sectional study	Malaysia	1272	Hesitancy rate about covid vaccination was 22.9% (n=291) while acceptance rate was 7.1%	Fear of Covid-19 self-infection by vaccines Fear of harm to mother and baby General maternal anxiety
6	Gupta A. et al, 2022 <sup>14</sup>	COVID-19 Vaccine Hesitancy among Pregnant Women: A Facility-Based Cross-Sectional Study in Imphal, Manipur	Cross-sectional study	Manipur, India	163	Vaccine hesitancy was found in 77.9% (n=127)	Lack of knowledge Fear of complications. Uncertainty about vaccine safety Uncertainty about vaccine efficacy
7	Dhakal R. et al, 2023 <sup>15</sup>	Pregnant women's awareness, perception, and acceptability of COVID-19 vaccine attending antenatal clinics in Bharatpur, Nepal	Cross-sectional study	Nepal	644	Vaccine hesitancy was 78% (n=502)	Uncertainty about vaccine safety Fear of side effects to baby and mother Inaccessibility to vaccines Lack of knowledge
8	Tefera Z. et al, 2022 <sup>16</sup>	A Mixed-Methods Study of COVID-19 Vaccine Acceptance and Its Determinants Among Pregnant Women in Northeast Ethiopia	Mixed-Methods study	Northeast Ethiopia	702	Vaccine hesitancy was 77.4% (n=543) while acceptance rate was 22.6%	Fear of harms. Lack of information. Uncertainty about vaccine safety Fear of self-infection
9	Mustafa Z. U. et al, 2022 <sup>17</sup>	COVID-19 Vaccine Hesitancy among Pregnant Women Attending Antenatal Clinics in Pakistan: A Multicentric, Prospective, Survey Based Study	Multicentric-Survey based study	Pakistan	405	Vaccine hesitancy was found in 56% (n=227)	Lack of knowledge Risk of side effects to mother and baby Family pressure Inaccessibility to required vaccine
10	Omar S. M. et al, 2023 <sup>18</sup>	COVID-19 vaccine acceptance among pregnant women: a hospital-based cross-sectional study in Sudan	Cross-sectional study	Sudan	623	Hesitancy rate was 97.3% (606) and acceptance rate was 2.7%	Uncertainty about vaccine safety Uncertainty about vaccine efficacy Fear of risk of self-infection by vaccine History of earlier reproductive illness Lack of knowledge

## DISCUSSION:

Our purpose of systematic review is focused on measuring the prevalence of reluctance and hesitancy to the uptake of COVID-19 vaccine and describing various factors and their influence on uptake the vaccine among women of reproductive age and pregnant women. We have a total sample size of 5945 from ten different developing countries and the mean hesitancy calculated is 55.74%. The countries included in our study are Ethiopia, India, Iran, Kenya, Malaysia, Pakistan, Nepal and Sudan. Sudan has the highest percentage of hesitancy among pregnant women.

For controlling pandemic, the vaccines are the safest, most efficient and cost effective<sup>19</sup>. They activate the natural immune system of our bodies and prepare them for any kind of future attack. Mostly the vaccines used against COVID-19 are m-RNA vaccines. They are better than other traditional vaccines because they activate both humoral and cellular immune response and have a short manufacturing duration.

The hesitancy among pregnant ladies results from a group of factors including uncertainty about vaccine safety, uncertainty about vaccine efficacy, fear of risk of self-infection by vaccine, history of earlier reproductive illness, lack of knowledge and lack of awareness regarding vaccine. Personal beliefs, cultural norms and social networks also have influence on this crucial decision making among women of reproductive age. The perception of potential risk of COVID-19 vaccine to maternal health and fetus is often routed in limited data available on safety of the vaccine.

In developing countries, the literacy rate is much lower as compared to the developed countries so there is lack of knowledge and information regarding vaccine safety. Spread of false information by various people creates a fuss among illiterate people and leads to the reluctance of expecting ladies towards vaccination.

The COVID pandemic amplified the problems faced by pregnant ladies. In addition to complications, emotional distress caused by spread of infection is posing serious psychological impacts on maternal health<sup>20</sup>. The emotional distress is due to the lack of access to the basic health facilities in case of any kind of Gestational emergency.

tional emergency.

Our systematic review highlights the significance of effective communication strategies in addressing vaccine hesitancy. Controversial information from health-care workers, social media and various other sources contribute to confusion among pregnant women. Public suspicion about vaccine reduces their acceptance rate<sup>21</sup>. The success of any immunization program depends on the public acceptance of vaccination.

Due to risk of vertical transmission of COVID-19 the pregnant ladies are among the one of the most important population who needs to take additional precautions<sup>22</sup>. Immunization can provide protection against severe COVID-19 outcomes for pregnant women. As is the case with all other viral diseases the best tool that can save humanity from this pandemic is a potent vaccine<sup>23</sup>. Public health campaigns should be designed to enlighten the benefits of COVID-19 vaccine uptake while addressing factors creating hesitancy for the uptake. Providing transparent information regarding COVID-19 vaccine can reduce the hesitancy ratio.

The findings from our systematic review showed that 55.74% women of reproductive age and pregnant women are hesitant for vaccination. The percentage is a larger than the review article published previously on the same topic because we conducted our review article on low and middle income countries where there are many social norms and beliefs regarding vaccine uptake. Moreover the lack of transparent information plays a major role in creating confusion and hesitancy among pregnant women.

Past experiences with various other vaccines among pregnant women have both positive and negative responses. Those who experienced any adverse effect with any other vaccine previously are now reluctant to receive COVID-19 vaccine. It is also noted that unemployed women and women with low education are more likely to show reluctance to the vaccine<sup>24</sup>.

There are many limitations to our review article as the data on pregnant women is very less and there is scarce data on effects of vaccination on pregnant ladies. Also the included studies covered only large cities so the people living in remote areas and urban slum residents may be missed.

**CONCLUSION:**

The hesitancy of vaccine among pregnant ladies was found relatively high in developing countries. This is because of many socioeconomic factors including domestic pressure, social myths about vaccination, lack of knowledge, fear of risks etc. This also depicts the necessity of intervention required for proper guidance and counselling of pregnant women as well as their families.

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