OPEN ACCESS

Haya: The Saudi Journal of Life Sciences

Abbreviated Key Title: Haya Saudi J Life Sci
ISSN 2415-623X (Print) | ISSN 2415-6221 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: https://saudijournals.com

Review Article

Knowledge and Attitude of Pregnant Women Regarding Vaccine Uptake: A Scoping Review

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DOI: https://doi.org/10.36348/sjls.2026.v11i02.003 | **Received:** 14.12.2025 | **Accepted:** 09.02.2026 | **Published:** 13.02.2026

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Abstract

Background: Immunization during pregnancy, specifically with Tdap and Influenza vaccines, is vital for reducing maternal and neonatal morbidity and mortality. Despite global recommendations, vaccination coverage remains suboptimal due to knowledge gaps, safety concerns, and negative attitudes among expectant mothers. ***Aim:*** This review evaluates the current state of knowledge and attitudes regarding Tdap and Influenza vaccination among pregnant women and assesses the impact of educational interventions on vaccine uptake. ***Methods:*** A systematic literature search was conducted across PubMed, Cochrane, MEDLINE, and Google Scholar for peer-reviewed studies published between 2020 and 2024. The search utilized keywords related to pregnancy vaccination, Tdap, influenza, and educational interventions. A total of 27 studies (24 quantitative, 1 qualitative, and 2 mixed-methods) were included in the final synthesis. ***Results:*** Findings reveal significant global variations in vaccine awareness. Studies from Saudi Arabia, India, and China reported low levels of knowledge regarding vaccine safety and the benefits of maternal immunization. In contrast, European studies generally showed higher awareness, though misconceptions regarding fetal risks persisted. Across all regions, the primary barriers to vaccination included fear of side effects, lack of healthcare provider (HCP) recommendations, and misinformation. Conversely, educational interventions—including tailored mobile applications and provider-led health education—demonstrated a marked increase in vaccine acceptance and uptake post-intervention. ***Conclusion:*** Knowledge gaps and lack of HCP encouragement are critical barriers to maternal immunization. Structured educational interventions and strong provider-patient communication are essential strategies to demystify vaccinations and improve uptake. Future research should focus on longitudinal, culturally tailored interventional studies to develop effective public health campaigns.

Keywords: Pregnancy, vaccination, barriers, immunization, Tdap and Influenza vaccines.

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1. INTRODUCTION

Immunization during pregnancy is critical in safeguarding maternal and fetal health against a spectrum of vaccine-preventable diseases. Getting vaccina against the flu while pregnant stands as one of the most effective measures to safeguard both the mother and the infant for several months postpartum against flu-related complications. As for the Tdap vaccine, pregnant women are urged to receive it during pregnancy between the 27th and 36th weeks of gestation. Pregnant women should take the Tdap and Influenza vaccine as these vaccinations help to prevent diseases that can be fatal to both the mother and the baby. Vaccination remains suboptimal for a variety of reasons, including the absence of knowledge about vaccines and unfavorable attitudes towards them (Zhang *et al.,* 2025). This review seeks to evaluate the pregnant women's knowledge about Tdap and Influenza vaccines. Thus, this review aims to identify whether targeted educational interventions that are applied before and after education can increase the rates of vaccine coverage among expectant mothers based on studies that compare pre- and post-educational data. Therefore, the primary aim is to assess the Knowledge and Attitude of Pregnant Women regarding Vaccine Uptake before and after Educational Intervention.

2. Search Strategy

To identify relevant literature on vaccination during pregnancy, a comprehensive search strategy was employed. For this study, renowned databases such as PupMed, Cocrhane, MEDLINE, and google scholar were extensively explored. Keywords were meticulously selected to sum up the essence of the topic. These include terms such as “pregnancy vaccination,” “Tdap vaccine,” “influenza vaccine,” “knowledge,” “attitudes,”

"barriers," "educational intervention," and "pregnant women". A strict selection criterion was implemented, focusing on peer-reviewed articles from the last six years to ensure the data's relevance and recency.

2.1. Inclusion Criteria

It includes studies conducted on pregnant women, exploring the utilization of Tdap and Influenza vaccination among pregnant women. Also, including research articles focusing on the use of educational approaches/interventions linked to Tdap and Influenza. The included studies that published in English and have been published within the last five years, ranging from 2020 to 2024.

2.2. Exclusion Criteria

Our research excluded studies that are not related to Tdap and Influenza vaccination, non-English publications, studies published before 2020, and studies published as abstract only.

3. LITERATURE REVIEW RESULTS

50 studies were revealed, 22 studies were not involved because they are not fellow inclusion criteria, so 27 studies included: 24 quantitative studies, one was qualitative and two were mixed methodology.

3.1. Pregnant women's knowledge of Tdap and influenza vaccination

According to a Saudi study on pregnant women in the Taif region of Saudi Arabia, the majority of participants lacked basic knowledge about the nature of pertussis disease or the effectiveness of the vaccine. For example, 25.2% of participants knew that there was a vaccine to protect against pertussis, 30.7% of respondents believed that pregnant women were more at risk from the vaccine than non-pregnant women, whereas 10.7% were aware of its safety and side effects, and 18.7% knew that receiving the vaccination would prevent a newborn from getting pertussis (Alshahrani *et al.,* 2023).

Another Saudi study conducted in Alhasa showed that 40.1% of respondents were aware that 25.7% of respondents were aware that the flu vaccine might cause birth defects, 30.7% were aware that pregnant women are equally vulnerable to flu-related problems as non-pregnant women, and 27% were aware that the vaccine is safe while nursing (Albattat *et al.,* 2021).

An Italian survey showed that 629 (85%) of the women surveyed had awareness about protection offered by influenza vaccine against influenza during gestation. Almost half pregnant women knew that maternal vaccinations against pertussis and influenza, and protect infants during their first several months of life. Furthermore, 244 (33%) and 128 (17%) pregnant women, respectively, thought that the pertussis and influenza vaccines could infect their unborn children (Vilca *et al.,* 2020).

A previous study was conducted in Czech showed that just 959 out of 4616 individuals, or roughly 21% of the total, were aware that they might receive an influenza vaccination while pregnant. The Internet was the popular source of information for influenza vaccination during gestation, followed by general practitioner, and a gynecologist (Kynčl *et al.,* 2023).

Among the included study a Chinese study showed the least percent of awareness regarding vaccination during pregnancy as only 6% of included pregnant women had high total knowledge score on seasonal influenza vaccination (Wang *et al.,* 2021).

In west Bengal in India, less than half of the women lack knowledge about the principles of maternal immunization. Overall, there was very low awareness about Tdap vaccine. Most of the participants had no information about Tdap. The majority were not aware that a vaccine is available for influenza; had not heard about the influenza vaccine recommendation for pregnant women by the government. The majority had not received maternal influenza vaccine recommendations from a healthcare provider (T. Khan *et al.,* 2024).

Among 250 women 65.6% of the women thought they knew too little about vaccines during pregnancy and 93.6% of pregnant women said they needed more information on vaccinations, while 87.6% of all women said they wanted more information about this subject. (Brillo *et al.,* 2022).

An Italian study showed low level of awareness regarding the vaccines that are typically advised during pregnancy; less than half of women had no idea that the influenza vaccine is recommended during gestation period, and only 25% of respondents were aware that vaccination against MMR is not advised during gestation (Licata *et al.,* 2023).

In a polish study, the subjective assessment of general knowledge of vaccination against influenza was fairly high, revealed that the majority of participants believed they knew enough to make an informed choice regarding this vaccination (Pisula *et al.,* 2022).

Among 404 Saudi pregnant women, the flu vaccine during pregnancy was not well-known to 60.6% of the participants. More than half of the participants have a bad opinion about getting the flu shot while pregnant (Albattat *et al.,* 2021).

A study conducted in Taiwan, on assessing knowledge scale scores about vaccination against influenza it was reported that the more than half of participants gave correct answer (Chang *et al.,* 2022).

Also, lack of knowledge was reported in a Turkish study showed that there were about half pregnant women knew about the influenza vaccine (Sağlam *et al.,* 2022).

A survey of 600 pregnant women revealed that about half of the respondents were aware of the increased risk of hospitalization, the risks of pertussis for the newborn, and the fact that the NIP provided free Tdap vaccination for pregnant women. According to two-thirds of the mothers, Tdap is either absolutely essential or helpful in protecting the infant. Even though 25% of the sample thought Tdap MI might be helpful, they did not believe they needed to get vaccinated (Marchetti *et al.,* 2021).

A descriptive study showed that the majority of participants were unaware of the risks associated with the Tdap vaccine during pregnancy, during breastfeeding. Regarding immunization, about half were unaware of when Tdap should be administered, 30.7% believed it should be administered prior to pregnancy, and 74% were unaware of how frequently Tdap should be administered (Miranda-Rivas *et al.,* 2022). A Tunisian study included 1348 pregnant women showed that 619 women heard about the influenza vaccine before, 73 had enough information about vaccine safety and side effects (Dhaouadi *et al.,* 2022).

3.2. Attitude Toward Tdap and Influenza Vaccination during Pregnancy

A Saudi study done in Al-Ahsa included 403 Saudi pregnant women showed that more than half of participants had an unfavorable outlook on receiving the flu shot while pregnant (Albattat *et al.,* 2021).

An Italian study included 743 pregnant women reported that the study sample's self-reported influenza and pertussis vaccination uptake was 6.5%.and 4.8 %, respectively (Vilca *et al.,* 2020). Another study showed that, just under 13% of the 668 pregnant women who received vaccination against influenza annually away from their first trimester of their pregnancy (Kynčl *et al.,* 2023). A previous study showed that the overall percentage of participants who accepted the seasonal influenza vaccine was 76.5% (Wang *et al.,* 2021).

Regarding pertussis vaccination a previous study showed that self-reported pertussis vaccination coverage during pregnancy was only 1.6 % (95% confidence interval, 1.3–2.0 %) (LIPTAKOVA *et al.,* 2023). In another study most of women were willing to take, the primary reasons for their willingness to receive influenza vaccine were the belief that their baby would be safe and healthy, the vaccine would save them, or both the mom and baby would be healthy. The rest would take if doctor recommended it or to prevent catching cold reflecting the importance of health education (T. Khan *et al.,* 2024).

Analyzing respondents' attitudes toward vaccines showed strong evidence, more than half of pregnant women, supports the safety of vaccines during gestation. The perceptions of unrealistic risk was seen in relation to; unfavorable attitudes about vaccination during gestation, low prevalence of receiving vaccination among pregnant women and that Tdap vaccine raises the chance of fetal mortality, premature birth, and abortion (Licata *et al.,* 2023).

In a different Italian study, the vaccination uptake rates for influenza and pertussis were 18.9% and 56.5%, respectively. Merely 15.6% of participants were vaccinated against both pertussis and influenza (Ferrari *et al.,* 2023).

Analysis of attitudes of pregnant women regarding vaccination showed that 36.0% of them accept pertussis vaccination during pregnancy. For influenza vaccination, 36.7% of women accept vaccination for pregnant women during pregnancy (Jiang *et al.,* 2022).

According to a cross-sectional study done in Kenya, the majority of women were eager to receive the influenza vaccine if it was offered because they thought it would protect pregnant women. Additionally, the majority of the women who were included believed that receiving the vaccination against influenza while being pregnant was safe, and around half of them thought that if a mother received the vaccine, her unborn child would be protected against influenza (Otieno *et al.,* 2020).

A previous study showed that among most of women who refused vaccination, the stated explanations for the unwillingness or refusal to receive an influenza vaccination were; financial insufficiency, lack of time, lack of knowledge, fear of adverse reactions on having flue before the vaccine, about the effectiveness of influenza vaccinations, and being concerned about the potential risks to the unborn child from receiving the vaccine while pregnant. The small percent of women who approved to have vaccination they were willing to receive an influenza vaccination for the sake of themselves and their unborn children, pregnant women (Sağlam *et al.,* 2022).

A Saudi study showed that of the study participants, most of participants heard of the influenza vaccination. Women cited a number of reasons why they were unable to have a flu shot. Most interviewees cited many obstacles to immunization including; fear of side effects, fear of injection, previous bad experiences with flu vaccination, and suspicious about the necessity of vaccination (Alqahtani & Jahan, 2024).

Although half pregnant women considered getting an influenza vaccination while pregnant is safe. In spite of this, only 21% of women received vaccination against influenza, and 17.5% planned to do so. Women who received vaccination against influenza during gestation most frequently chose to do so in order to protect the fetus and themselves from infection. While in

pregnant women who refused being vaccinated the most common reason for their refusal were; avoid taking drugs when pregnant, being worried about how vaccinations will affect the fetus and about potential post-vaccination complications, vaccination carry risk that they would get influenza, the vaccination is ineffective, having negative reactions to prior immunizations, and considering influenza should not be considered a serious disease (Pisula *et al.,* 2022).

In a large-scale study included 4,617 pregnant women, almost half of them believed that getting vaccinated against influenza while pregnant was pointless. Additionally, roughly 50% of participants thought vaccinations were beneficial. The potential of receiving an influenza vaccination while pregnant was only known to roughly 21% of all participants. The Internet was the popular source of information for influenza vaccination during pregnancy, followed by other media, general practitioners, and gynecologists. In the questionnaire, a number of expectant mothers stated that their doctor does not advise getting vaccinated against influenza while pregnant (Kynčl *et al.,* 2023).

Another large study included 1193 pregnant women, showed that over half of the participants were willing to have the influenza shot. Additionally, those participants felt that pregnant women can be protected against influenza by the influenza vaccine and were sure about the safety of unborn babies following the mother's influenza vaccination. When general practitioners advised women to get vaccinated against influenza during each pregnancy, nearly half of them agreed. This study reported some barriers against vaccination during pregnancy including misconception about harmful effects of vaccination on women during pregnancy and lack of vaccine effectiveness (Akmatova *et al.,* 2024).

A survey was carried out in Liverpool showed that regarding Influenza vaccination, the majority of pregnant women who received vaccination against influenza. The majority of women who had either gotten or planned to have vaccination against influenza also received the pertussis vaccine. Approximately half of the women received previously influenza vaccine. In general, the majority of respondents thought that vaccinations prevented illness, and much more people who had received or planned to receive an influenza vaccination thought that vaccinations were safe (Kilada *et al.,* 2023).

Another study estimated attitude against vaccination during pregnancy showed that perceived severity had the greatest mean attitude subscale score (18.74) among the six perspectives on the attitude scale, while self-efficacy had the lowest mean attitude subscale score (14.76). The average score on the attitude scale was 99.88 overall (Chang *et al.,* 2022).

A study was carried out in India showed that the majority of women surveyed had not received vaccination against influenza during previous gestation; the majority of those women thought about getting it again during their current pregnancy; and approximately one-third of women who didn't have the vaccination during their previous gestation thought about getting it during their current pregnancy. Over half did not think about receiving an influenza vaccination during their current pregnancy (R. Khan & Benjamin-Niles, 2024).

Some studies reported low attitude of women towards vaccination during pregnancy. A study included 189 pregnant women, only about one quarter of participants received the Tdap vaccine. The main two reasons to avoid it were lack of information by a health professional and fear of effects during pregnancy (Miranda-Rivas *et al.,* 2022). A cross-sectional study showed that out of 1348 pregnant women, 72 had previous influenza vaccination at least once in the past and 45 uptake current influenza vaccine during pregnancy (Dhaouadi *et al.,* 2022).

3.3. Role of Educational Interventions

The misconceptions about vaccination during pregnancy call for further interventions in form of health education in order to demystify the misinformation as well as persistently stress on measures against possible dangers that might harm the mother as well as the newborn child through vaccination. Educational interventions remain highly dependent on healthcare providers. These recommendations, as well as the rapport they develop with patients, help in the determination of whether or not to accept the vaccines. Research indicates that information from doctors is likely to have a greater influence on pregnant women than other sources. The figures are evidence of the implication of doctors in the giving out of information on vaccines to pregnant women.

The importance of health education in improving attitude of pregnant women towards vaccination was highlighted in a recent study as Kim and his colleagues showed that significant correlation between receiving information and receiving vaccination against Tdap vaccination during pregnancy. This suggests that it was important for pregnant women to understand the benefits of having vaccination during gestation to their infants and to reduce their unwillingness about vaccination during pregnancy and enhance receiving vaccination against influenza (Kim *et al.,* 2021). Also, an Italian survey showed that most pregnant women who participated in the poll regarded obstetricians and midwives as the most reliable providers of information. as regard vaccination during pregnancy, and, their recommendation, was influential on acceptance of being vaccinated (Vilca *et al.,* 2020).

Another study showed that acceptance of pregnant women to receive influenza vaccination was higher among who received recommendation from doctors or family members than those who did not. This

highlighted that the primary obstacles to vaccination against influenza and pertussis were safety concerns and a lack of advice from healthcare professionals (Wang *et al.,* 2021). The most common reasons given by participants for receiving Td were the vaccination advice of health care workers (T. Khan *et al.,* 2024).

3.4. Impact of Educational Interventions on Vaccine Uptake

According to an analysis that looked at the impact of an individually tailored educational application, on attitudes of pregnant women towards vaccination showed that, more than half of recipients had high perceived risk of having influenza disease during gestation, be more confident regarding efficacy of vaccination against influenza, and high knowledge about this vaccination compared to roughly half of those who did not receive this tailored education (Dudley *et al.,* 2022).

A prospective study showed that after receiving information regarding influenza vaccine, the expectant mothers were asked once more if they would be ready to get their unborn children vaccinated. The percentage of women who accepted the immunization rose from 22.6% to 40.9% following an educational intervention (Sağlam *et al.,* 2022).

A randomized control study evaluated effect of educational intervention on knowledge showed that the group who received educational intervention showed considerable improvements regrading benefits, barriers and Self-efficacy. In contrast, the group who didn't receive educational intervention only demonstrated notable improvements with a smaller proportion in the two perspectives of perceived harshness and susceptibility (Chang *et al.,* 2022).

The group that got health education had considerably higher awareness than the group that did not, according to a randomized controlled analysis. Although there was a considerable increase in awareness of tetanus vaccine injections and that pregnant women should receive two shots of the vaccine, the intervention group's improvement in tetanus vaccination awareness was also much greater than that of the control group. awareness in the intervention group that issues such as burning or painful urination and itchy genitalia during pregnancy are signs of a reproductive tract infection in two groups. Nonetheless, the intervention group's improvement in awareness of reproductive tract infections was likewise noticeably greater than that of the control group (Choudhury & Choudhury, 2022).

An interventional study showed that health education resulted in raising the percentage of women who have had an influenza vaccination from 29.0% to 42.9%. Additionally, the percentage of pregnant women who received vaccinations against influenza and pertussis rose from 26.1% to 42.2% (Cremer *et al.,* 2024).

4. SUMMARY OF GAPS

4.1. Synthesis of Literature Findings

Across the reviewed literatures, maternal knowledge and attitudes towards influenza and Tdap vaccination show substantial variation, showing lower awareness in Middle Eastern settings compared to European countries. While studies from Saudi Arabia reported limited knowledge of vaccine safety and benefits during pregnancy, researches from European countries highlights higher awareness and acceptance, reflecting differences in health education and public health policies. Overall, the evidence suggests that improving communication and addressing safety misconceptions are key to increasing vaccine uptake in pregnancy.

4.2. Gaps in Existing Literature

Current literature highlights important insights into maternal knowledge, attitudes, and barriers toward influenza and Tdap vaccination; however, several gaps remain unrevealed. The majority of researches use self-reported data and are cross-sectional, which restricts the interpretation of causality. There is also a lack of longitudinal studies examining how attitudes change across pregnancy and after delivery.

Furthermore, few interventional studies were performed to explore the effectiveness of targeted educational interventions or the role of healthcare providers in shaping maternal decision-making, none of them were done in Saudi Arabia. Addressing these gaps is essential to develop culturally tailored strategies that can improve vaccine uptake during pregnancy.

4.3. Implication of Research and Hypothesis

The existing evidence suggests that vaccination uptake among pregnant women is strongly influenced by level of knowledge and perceptions of vaccine safety. These findings highlight the need for structured educational programs and consistent provider recommendations to improve maternal immunization rates. Highlighting that communication strategies and addressing misconceptions may lead to higher vaccine acceptance, leading to protecting both mothers and infants from preventable diseases.

Based on the reviewed literature, the following hypothesis can be proposed: pregnant women who receive an educational intervention about Tdap and Influenza vaccine will show an increase in knowledge regarding these vaccines, pregnant women who receive an educational intervention about Tdap and Influenza vaccine will show a positive attitude toward these vaccines and pregnant women who receive an educational intervention about Tdap and Influenza vaccine will demonstrate an increase in their uptake of Tdap and Influenza vaccines.

5. CONCLUSION

In conclusion, the literature review from different studies indicates that educational modifications improve pregnant women's understanding and perceptions of Tdap and Influenza vaccines. Some research shows that approaches such as education messages, culturally specific material, and the collaboration of healthcare workers lead to heightened awareness and favorable views of vaccination. Education, cultural practices, and trust in healthcare systems are also important determinant factors in vaccination.

Overall, the reviewed literature underscores that knowledge gaps, safety concerns, and limited provider recommendations remain the most important key barriers against maternal vaccination. Addressing these challenges through targeted interventions and consistent health messaging has the potential to significantly increase vaccine acceptance, saving the health of both mothers and their infants.

Therefore, the design of the subsequent vaccination campaigns should embrace the use of educational approaches, support, and involvement of the community in addressing potential barriers, as well as increasing the pregnant women's vaccine acceptance level.

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