Knowledge and Attitudes of Pregnant Women Toward Seasonal Influenza Vaccination

Asmaa Morgan Farahat Khatap[(1)], Mai El Ghareap Hassan [(2)], Zeinab Ali Baraia [(3)]

(1) Lecturers of Obstetrics and Gynecological Nursing, Faculty of Nursing, Suez Canal University, Egypt
(2) Assistant Professor of Family and Community Health Nursing, Faculty of Nursing, Port Said University, Egypt
(3) Assistant Professor of Obstetrics and Gynecological Nursing, Faculty of Nursing, Suez Canal University, Egypt

Abstract

Background: Unfavourable pregnancy outcomes were more likely to occur in pregnant women who infected with influenza throughout their pregnancy. Influenza vaccination given at any trimester of pregnancy. Pregnant women receive direct protection from the flu vaccine, and new-borns receive passive immunity. **Aim:** to assess pregnant women's knowledge and attitudes toward seasonal influenza vaccine. **Design**: A cross-sectional descriptive design used in the study. **Setting**: Suez Canal University Hospitals. Sampling: A convenient sample of 100 pregnant women. Tools: It includes three tools:1st was structured questionnaire sheet, 2nd was women's seasonal influenza and vaccine knowledge, and 3rd was health belief model for women's attitudes regarding influenza and vaccination. **Results**: It was clarified that less than a quarter of the study sample identified media as their primary source of information about the flu vaccine, followed by relatives and friends. Additionally, more than one-quarter of the participants reported having received the flu vaccine. There wasn't a correlation between pregnant women ' knowledge and attitudes regarding seasonal influenza and its vaccination. **Conclusion**: A moderate level of knowledge among pregnant women regarding seasonal influenza and its vaccine, pregnant women generally demonstrated a positive attitude, The study further identified statistically significant differences in knowledge scores based on education level, employment status, and residence while no significant differences were observed in attitude scores. **Recommendation:** Develop and implement educational programs about seasonal influenza and its vaccine. Conduct further research to explore barriers to improve knowledge about seasonal influenza vaccine, focusing on sociocultural and economic factors.

Keyword: Attitudes, Knowledge, Pregnant Women, Seasonal Influenza Vaccination.

Introduction

Women are particularly vulnerable to infectious disease, such as seasonal influenza, due to the special physiological conditions of pregnancy. Pregnancy-related influenza raises the risk of serious complications like pneumonia, hospitalisation, and unfavourable fetal outcomes like low birth weight and preterm birth. The World Health Organisation (WHO) and other national health authorities advise pregnant women, regardless of their stage of pregnancy, to get the seasonal influenza vaccine as a safe and effective preventive strategy in view of these risks **(Smith, Megli, & Chappell, 2023).**

In the Global Influenza Strategy of 2019–2030, WHO further cemented its commitment to developing robust national capacity to execute seasonal influenza vaccine programs in all high-risk categories as part of the larger global strengthening of preparedness and response. In order to serve and protect individuals, sustain key health services during influenza epidemics, and lessen transfer to additional susceptible groups **(World Health Organization,2019).**

The risk of obstetric difficulties, acute maternal sickness, vertical transmission to the foetus, and perinatal transmission upon delivery are all linked to viral infections during pregnancy. Pregnant women are particularly vulnerable to infections due to changes in hormone production and immune system function. **(Racicot & Mor, 2017).** According to a prospective cohort study, pregnant women who contracted influenza during their pregnancy had a higher chance of experiencing negative pregnancy outcomes, such as late pregnancy loss and a decrease in the birthweight of their new-born, than women who did not contract the virus **(Etti et al., 2022; Dawood et al., 2021; Mertz et al., 2019).**

The influenza vaccine is a good way to avoid getting sick. Although the second or third trimester is the best time to administer vaccine, it can be given at any point throughout pregnancy. New-borns are protected from disease for up to

six months after delivery by inactivated vaccinations, which are safe for both the mother and the child. This is particularly beneficial as children at this age may not yet have been vaccinated **(Giles, etal.,2019).** Pregnant women who receive an influenza vaccination can benefit directly, and infants up to six months old can benefit from passive immunity provided by maternal antibodies. A high priority group for influenza vaccination is expectant mothers **(Oguz, & Senel, 2024).**

Despite recommendations for influenza vaccination during pregnancy, uptake remains low, primarily due to safety concerns and fears about potential genetic abnormalities. Collaborative efforts among maternal care providers could enhance maternal immunization by consolidating care and promoting consistent messaging. A key barrier to vaccine acceptance is the absence of clear and direct recommendations from obstetricians, which has been identified as a contributing factor to low vaccination rates. Additionally healthcare providers' attitudes and behaviors significantly influence vaccination uptake among pregnant women **(Lu et al., 2012; Ugezu & Essajee, 2018; Loubet et al., 2019).**

It is extremely important that pregnant women receive their influenza vaccinations in a timely manner. Pregnant women, however, are frequently reluctant to obtain seasonal influenza vaccination due to their lack of pertinent knowledge, concern of potential adverse effects, skepticism over the safety of the vaccine, and inadequate recommendations. Vaccination resistance is a barrier against influenza. Therefore, it is crucial for relevant organizations and healthcare professionals to understand how pregnant women feel about receiving the influenza vaccine and the reasons why they may be reluctant to do so **(Hu et al., 2019; Ofeddu et al., 2019; Wang et al., 2019; Otieno et al., 2020)**.

Based on many variables that affect a person's access to healthcare services as well as their health-related decisions and behaviors, the Health Belief Model (HBM) is helpful in predicting health choices and behaviors. Its efficacy has been proven in a variety of settings, including during pregnancy and in determining how well-received the seasonal flu vaccine is among this population **(Rosenstock ,1974, VanDyke & Shell, 2017; Fadaei et al.,2020)**. Understanding pregnant women's knowledge and attitudes towards the seasonal influenza vaccine is crucial. The purpose of this study is to assess pregnant women's knowledge and attitude regarding seasonal influenza vaccine. This study's findings, which indicate information gaps and attitudinal hurdles, can drive public health initiatives and educational programs aimed at increasing vaccination uptake during pregnancy, thereby safeguarding both maternal and newborn health.

Significance of the study:

An estimated one billion people globally get influenza each year, with three to five million of those cases being severe, according to the World Health Organisation (WHO), resulting in an estimated 290,000 to 650,000 deaths worldwide **(WHO, 2022; WHOEMR, 2019).** Pregnancy is a notable risk factor for severe influenza infections. Pregnant face a markedly elevated risk, with studies reporting a seven-fold increase in influenza-associated hospital admissions compared to non-pregnant individuals **(Mertz et al., 2019).** This increased vulnerability underscores the critical importance of targeted preventive measures and management strategies for influenza during pregnancy.

Vaccination has proven to be a cornerstone of public health, significantly reducing the burden of influenza worldwide. Between 2019 and 2020, vaccination efforts successfully averted an estimated 6,300 fatalities, 3.7 million hospital admissions, 7.5 million cases of influenza, and 3.7 million medical visits **(Oakley et al., 2021; Centers for Disease Control and Prevention [CDC], 2020).**

Maternal vaccination rates are still low in many nations, despite the fact that the influenza vaccine has been proven to effectively protect mothers, fetus, and infants **(Ditsungnoen, etal; 2016; Zaraket, etal, 2019).** Addressing barriers such as limited awareness, false beliefs and restricted accessibility is posing significant public health concerns to improve vaccination rates and protecting pregnant. So, the study used HBM to assess knowledge and attitudes of women during a period of pregnancy in which increase vulnerability to infection.

Aim of the study

This study aims to assess pregnant women's knowledge and attitudes toward seasonal influenza vaccine.

Research objectives

By achieving the following objectives, the study's aim was achieved:

- Identify pregnant women's knowledge regarding seasonal influenza vaccine
- Investigate pregnant women's attitudes regarding seasonal influenza vaccine
- To explore the sources of information that pregnant women rely on when forming their opinions about the seasonal influenza vaccine.
- To determine the sociodemographic factors, affect knowledge and attitudes toward the seasonal influenza vaccine among pregnant women.

Research questions

- What is the level of knowledge among pregnant women regarding the seasonal influenza vaccine?
- What are the attitudes of pregnant women toward the seasonal influenza vaccine?
- What sources of information do pregnant women rely on when forming their opinions about the seasonal influenza vaccine?
- How do sociodemographic factors influence pregnant women's knowledge and attitudes toward the seasonal influenza vaccine?

Subjects and method

Study design:

This study was carried out using a descriptive cross-sectional design.

Setting:

This study was carried out in Suez Canal University Hospitals. To ensure diverse representation, the study was done in antenatal care clinics located in Suez Canal University Hospitals. The clinics offer full antenatal care, including immunization guidance and pregnancy follow up. Outpatient clinics served women from a variety of socioeconomic and educational backgrounds. To make participant recruiting and data collection easier, the study environment includes waiting lounges and counselling rooms.

Data were collected during standard antenatal visits, which usually involve health education examination and discussion. This setting provided convenience for participants and improved the study's capacity to monitor natural interactions and attitudes about influenza vaccination. Prior to data collection, ethical approval was acquired, and participants were informed about the study's objectives to ensure that ethical research standards were followed.

Target population:

Pregnant women who attended Suez Canal University Hospitals in Ismailia, Egypt. The study focused on pregnant women attending antenatal care clinics in all trimesters, regardless of age, socioeconomic situation, or education level, agree to participate in this study to ensure a thorough understanding of the factors that influence vaccination knowledge and attitude in this target population.

Exclusion Criteria:

- Pregnant women with communication obstacles, such as serious mental health disorders.
- Women who had previously participated in similar research to reduce bias.

Sample technique:

A convenient sample of a total of 100 pregnant women participated in this study.

Sample size:

X^2tests – Goodness-of- fit ters: Contingency tables

Analysis: Compromise: Compute implied α & Power

Input: Effect size W = 0.3
β/α ratio = 1
Total sample size = 100
Df = 5

Output: Noncentrality parameter =9.0000000
Critical X^2 =7.6804954
α err prob = 0.1747455
β err prob = 0.1747455

power(1-β err prob) =0.8252545 **(GPower3.1)**

Tools of data collection:

A structured questionnaire developed by researchers based on an extensive literature review. The questions were structured to align with the research objectives, ensuring relevance, clarity, and comprehensiveness. Data collected by using three the questionnaire sheets.

Tool (I): Structured Questionnaire Sheet

It was designed to collect comprehensive data relevant to the study objectives. It consisted of two primary sections.

- **First section: Socio-Demographic Data**: This section gathered basic demographic information about the participants, including age, marital status, educational level, residence, ...etc.
- **Second section: Medical and Obstetric History:** This section composed of 3 subsections.

a) **Medical Data:** This subsection focused on participants' medical backgrounds they have been diagnosed with, such as diabetes mellitus, hypertension, liver diseases, etc.

b) **Obstetric Data:** This subsection aimed to collect detailed obstetric history, including gravidity, parity, stillbirth, abortion, gestational age, antenatal care…etc.

c) **Women's History of Seasonal Influenza and Vaccine:** This subsection captured participants' history of past occurrences of seasonal Influenza and seasonal Influenza vaccine

Tool (II): Women's seasonal Influenza and vaccine Knowledge:

The knowledge assessment tool was developed by the researcher to assess women's understanding of seasonal influenza and vaccination. It consists of 20 items divided into two parts. The first part is seasonal influenza knowledge**.** It includes 10 questions focusing on the general knowledge of seasonal influenza, its symptoms, transmission methods, prevention, and complications. The second part is vaccination, it includes 10 questions addressing the benefits, safety, availability, schedule, and misconceptions about influenza vaccination.

Scoring System

Each correctly answered question scored one point, while incorrect responses receive zero points. The entire potential score for knowledge is 10 points, as is the total score for knowledge of vaccination, the total knowledge score is 20 points.

Tool (III): Health Belief Model for Women's Attitudes Regarding Influenza and Vaccination:

This tool was used to assess women's attitudes toward influenza and vaccination during pregnancy, a questionnaire based on the Health Belief Model (HBM) was utilized. This model is a well-established framework for understanding health behaviors and their underlying beliefs **Rosenstock, (1974).** The questionnaire included validated items designed to evaluate the effectiveness of the HBM to predict pregnant women's acceptance of seasonal influenza vaccination.

The tool was structured into six key constructs of the HBM.Perceived Susceptibility that used to assess the women perception of the likelihood of contracting influenza. It was composed of five items. Perceived Severity that used to evaluate the perceived seriousness of influenza and its potential complications during pregnancy. It was composed of four items. Perceived Benefits included questions measuring beliefs about the advantages of receiving the influenza vaccine. It was composed of seven items. Perceived Barriers included items to identify obstacles or concerns that might prevent vaccination. It was composed of eight items. Cues to Action included questions designed to explore the external or internal triggers that may prompt the decision to vaccinate. It was composed of 4 items. Self-efficacy assesses women's confidence in their ability to get vaccinated and make informed decisions about influenza prevention. It was composed of three items. Each item within the questionnaire was rated on a 5-point Likert scale, ranging from Strongly Agree (5) to Strongly Disagree (1). The structured approach allowed for a comprehensive analysis of the attitudes and beliefs influencing vaccination behavior during pregnancy.

Scoring System

For the attitude section, responses were rated on a scale from 5 to 1, corresponding to "strongly agree," "agree," "uncertain," "disagree," and "strongly disagree," respectively. The scores for negative statements were reversed. According to multiple constructs of attitude models, a higher mean score (closer to 5) suggests a positive attitude toward influenza vaccination. A lower mean score (closer to 1) reflects a negative attitude toward influenza vaccination.

Operational design:

Field of work:

Phase I: Preparatory:

The researcher carried out an extensive evaluation of regional and global literature pertinent to different facets of the research subject using books, papers, periodicals, and internet resources. The researcher then developed the instruments required for data gathering. Data collection tools evaluated by panel of experts specialized in community health nursing in addition to the maternity and obstetric health nursing fields to ensure the validity of the tools.

After receiving official approval to carry out the study, the researchers approached each woman, her, and requested her involvement in the study. Participants informed about the confidentiality of obtained data and their rights to withdraw at any time from the study. Then received her agreement to participate in the study.

Phase II: Implementation:

The research was conducted in outpatient clinics (antenatal) at Suez Canal University hospitals. The research team visited each data collection site two days per week. These visits were systematically scheduled to ensure consistent data gathering and participant engagement. The women were asked to complete questionnaire. It took about 20 to 30 minutes to complete their sheet. The data collection process was conducted over a period of three months, from beginning of August to end of October 2023. The timeline was planned to ensure sufficient sample size and diverse representation across the target population.

Validity and reliability of the study tools:

The tools were developed based on a thorough review of the literature and validated by a panel of experts in community health nursing in addition to the maternity and obstetric health nursing to ensure content validity. The reliability of the tool was tested using a pilot study, and the internal consistency was measured using Cronbach's alpha coefficient. The Cronbach's alpha coefficient was 0.875 for the 2nd tool "women's knowledge about seasonal influenza and its vaccine", and 0.830 for the 3rd tool "women's attitudes regarding influenza and its vaccine"

Ethical consideration

Ethical permission was permitted by the Scientific Research Ethics Committee of the College of Nursing; Suez Canal University on July 2023. Subsequently an official permission letter issued to the directors of antenatal care clinics in Suez Canal Universities to seek the approval for carrying out the study. Verbal approval was gained from the researched women, followed by a clear description of the study's purpose and voluntary participation. The researchers confirmed that all data collected would be utilized solely for the research aim and participants were notified of their right to withdraw from the study at any time.

Pilot study:

To test the instrument's applicability, clarity, and feasibility, a pilot study conducted on 10% (10 pregnant women) following tool development and before to data collecting. Additionally, pilot research assisted in estimating the amount of time required for data collection. The sample size excludes the pilot sample.

Limitations:

One limitation of the study was the difficulty in recruiting participants at the medical complex hospital. Many of the studied women rejected to participate due to time constraints, as they were unable to allocate sufficient time to be present at the hospital.

Statistical analysis of the data

IBM SPSS software package version 20.0 was used to analyze the data that was fed into the computer. (Armonk, NY: IBM Corp.) Numbers and percentages were used to describe qualitative data. The range (minimum and maximum), mean, standard deviation, and median were used to characterize quantitative data in order to confirm the normality of the distribution using the

Kolmogorov-Smirnov test. The results' significance was assessed at the five percent level. The tests that were employed were the Pearson coefficient to determine the correlation between two normally distributed quantitative variables, the F-test (ANOVA) for normally distributed quantitative variables to compare between more than two groups, and the student t-test for normally distributed quantitative variables to compare between two studied groups.

Results:

Table (1) indicates that 55% of women age range within the 20 to <30 years, with a mean age of 29.26 years. 55% of them have a high education level, followed by those with intermediate education (31%). The majority (97%) of women are married, with only a small percentage divorced (1%) or widowed (2%). (58%) of women are housewives, while 42% are employed. The data also indicates regarding place of residence (56%) live in urban and (44%) live in rural. The mean family size is 3.58 ± 1.32. (49%) of women live in homes with 3 to 4 rooms. The majority (65%) report enough income, while 28% indicate they do not have enough income.

Table (2) shows that 82% of women report no chronic diseases, while 18% do have one or more chronic conditions. The most commonly reported chronic conditions are diabetes and hypertension, each at 6%. Other conditions, such as chest diseases (7%) and endocrine issues (4%), With a mean of 2.71 pregnancies and a median of 3, the data indicates that most participants have had multiple pregnancies. The average of 1.53 births (median of 1). The data shows a fairly even distribution across trimesters, with 47% in the third trimester. A significant majority (84%) report following up during pregnancy, with most starting their follow-ups in the first trimester (67%). About 23% of participants experienced complications during pregnancy, while 77% did not.

Table (3) showed that (69%) of women had seasonal influenza. Only 26% reported having the flu during their current pregnancy, and (32%) in previous pregnancies, low percentage of women vaccinated during pregnancy (only 5 out of 29). With 69% of them aware of the flu vaccine. The primary sources of information about the flu vaccine include media (21%) and relatives/friends (20%). Only 29% reported having been vaccinated against the flu. Women those vaccinated did so during non-pregnancy (24 out of 29). The predominant reason for vaccination advice from health care provider however, 10.3% vaccinated on recommendation by family members or friends.

Table (4) The mean score of 7.82 ± 2.46 (out of a possible 13) indicates a moderate level of knowledge regarding seasonal influenza. The mean score of 2.84 ± 2.32 (out of a possible 10) reflects a low level of knowledge about the influenza vaccine. The overall mean score of 10.66 ± 4.23 (out of 23) reflecting a moderate level of knowledge of regarding seasonal influenza and its vaccine.

Table (5) shows the mean score of 15.61 ± 1.68 (out of a possible 25) indicates a moderate perception of susceptibility to seasonal influenza. The mean score of 12.58 ± 3.47 (out of a possible 20) suggests a moderate understanding of the potential severity of seasonal influenza. The mean score of 22.80 ± 5.19 (out of a possible 35) indicates a strong recognition of the benefits of the flu vaccine. The mean score of 21.02 ± 2.42 (out of a possible 35) indicates that women perceive relatively high barriers to vaccination. The mean score of 10.42 ± 3.92 (out of a possible 20) suggests that women may have limited external cues to seek vaccination. The mean score of 9.14 ± 2.78 (out of a possible 15) indicates a moderate level of self-efficacy regarding vaccination. The total score of 91.57 ± 9.92 (out of 150) reflects a generally positive attitude towards seasonal influenza and its vaccine.

Table (6): revealed that there is no correlation between studied women's knowledge and attitude regarding seasonal influenza and its vaccination. The p-value of 0.243 indicates that the correlation is not statistically significant.

Table (7): indicates a statistically significant difference in knowledge scores based on education level, employment status, and residence.

Table (8): shows that no significant differences in attitudes towards seasonal influenza and its vaccine sociodemographic factors, including age, education, marital status, employment, place of residence, number of rooms in the house, and household income

Table (1): Distribution of the studied women according to personal and Social Data (n = 100)

Personal and Social Data	No.	%
Age (years)		
<20	5	5.0
20 – <30	55	55.0
30 – <40	36	36.0
≥ 40	4	4.0
Mean ± SD.	29.26 ± 6.17	
Education		
Read and write	14	14.0
Intermediate education	31	31.0
High education	55	55.0
Marital Status		
Married	97	97.0
Divorced	1	1.0
Widowed	2	2.0
Employment		
Housewife	58	58.0
Working	42	42.0
Place of residence		
Urban	56	56.0
Rural	44	44.0
Number of family members		
Mean ± SD.	3.58 ± 1.32	
Monthly household income		
Not enough	28	28.0
Enough	65	65.0
Enough and over	7	7.0

SD: **Standard deviation**

Table (2): Distribution of the studied women according to health history (n = 100):

Health history				
A-General History	Yes	%	No	%
Do you suffer from any chronic diseases?	18	18.0	82	82.0
B-Women's History and Reproductive Health Previous history:	Mean ± SD.			
Number of pregnancies	2.71 ± 1.69			
Number of births	1.53 ± 1.26			
Number of abortions	0.52 ± 1.03			
Number of live children	1.62 ± 1.51			
Present history:	No.		%	
Gestational age	(N=100)			
First 3 months (1st trimester)	24		24.0	
Second 3 months (2nd trimester)	29		29.0	
Third 3 months (3rd trimester)	47		47.0	
When did you start following up during this pregnancy?	n= 84		n=16	
First 3 months Second 3 months Third 3 months	67 14 3		67.0 14.0 3.0	
Complication:	Yes	%	No	%
Have you had complications in this pregnancy?	N=100			
	23	23.0	77	77.0

Table (3): Distribution of the studied women according to history of Influenza practices (n =100):

Influenza Practices	Yes		No	
	No.	%	No.	%
Have you ever had seasonal influenza?	69	69.0	31	31.0
In Current Pregnancy	26	26.0	74	74.0
In a previous pregnancy	32	32.0	68	68.0
Have you heard of the flu vaccine?	69	69.0	31	31.0
If yes; what is the source?	(n=69)			
Health provider	17	17.0		
Relatives /Friends	20	20.0		
Media	21	21.0		
Reading(books)	11	11.0		
Have you ever been vaccinated against the flu?	29	29.0	71	71.0
If yes Was it during :	(n = 29)			
Pregnancy	5	17.2		
in non-pregnancy	24	82.8		
If the answer is during pregnancy:	(n = 5)			
In the first trimester	3	60		
In the second trimester	2	40		
In the third trimester	0	0.0		
What is the reason you received the flu vaccine?	(n = 29)			
From myself	6	20.6		
Health care provider	20	68.9		
Recommended by family members or friends	3	10.3		

Table (4): Descriptive analysis of the studied women according to score for Seasonal Influenza and Vaccine knowledge (n = 100)

Seasonal Influenza and Vaccine knowledge	Score Range	Total score
		Mean ± SD.
Women's Information's about Seasonal Influenza	**(0 – 13)**	7.82 ± 2.46
Women's Information about Seasonal Influenza vaccine	**(0 – 10)**	2.84 ± 2.32
Overall	**(0 – 23)**	**10.66 ± 4.23**

SD: **Standard deviation**

Table (5): Descriptive Analysis of the Health Belief Model Dimensions Among Studied Women Regarding Seasonal Influenza and Its Vaccination (n = 100)

Health Belief Model Dimensions	Score Range	Total score
		Mean ± SD.
Perceived susceptibility	**(5 – 25)**	15.61 ± 1.68
Perceived severity	**(4 – 20)**	12.58 ± 3.47
Benefits	**(7– 35)**	22.80 ± 5.19
Barriers	**(7 –35)**	21.02 ± 2.42
Cues to action	**(4 – 20)**	10.42 ± 3.92
Self-efficacy	**(3 –15)**	9.14 ± 2.78
Overall	**(30 – 150)**	**91.57 ± 9.92**

SD: **Standard deviation**

Table (6): Correlation between studied women's knowledge and attitudes regarding Seasonal influenza and its Vaccination (n= 100)

	Knowledge	
	r	p
Attitude	0.118	0.243

r: Pearson coefficient

Table (7): Association between the Aggregate Knowledge Score of the Examined Women and their Sociodemographic Characteristics (n=100)

Sociodemographic Data	N	Total knowledge score Mean ± SD.	Test of sig.	p
Age (years)				
10 – <20	5	7.20 ± 2.17	F= 1.382	0.253
20 – <30	55	10.56 ± 3.97		
30 – <40	36	11.19 ± 4.75		
≥ 40	4	11.50 ± 3.70		
Education				
Read and write	14	9.50 ± 2.90	F= 6.012*	<0.001*
Intermediate education	31	8.10 ± 3.84		
High education	55	12.40 ± 3.93		
Marital Status				
Married	97	10.64 ± 4.27	t= 0.375	0.708
Divorced	1#	15.0		
Widowed	2	9.50 ± 0.71		
Employment				
Housewife	58	9.86 ± 4.33	t= 2.260*	0.026*
Working	42	11.76 ± 3.88		
residence				
Urban	56	9.75 ± 3.99	t= 2.488*	0.015*
Rural	44	11.82 ± 4.29		
Number of rooms in the house				
1 – 2	46	9.85 ± 4.39	F= 0.926	0.491
3 – 4	49	11.55 ± 3.78		
> 4	5	9.40 ± 6.07		
Monthly household income				
Not enough	28	10.25 ± 3.90	F= 0.958	0.387
Enough	65	10.62 ± 4.02		
Enough and over	7	12.71 ± 6.99		

SD: **Standard deviation, t: Student t-test, F: F for One way ANOVA test,** p: p value for comparison between the studied categories, *: Statistically significant at p ≤ 0.05
#: Excluded from the (Relation) due to small number of case (n = 1)

Table (8): Relationship between the total attitude score of the studied women and their Sociodemographic data (n=100)

Sociodemographic Data	N	Total attitude Score Mean ± SD.	Test of sig.	p
Age (years)				
10 – <20	5	90.80 ± 4.09	F= 0.735	0.534
20 – <30	55	90.33 ± 11.22		
30 – <40	36	93.42 ± 7.68		
≥ 40	4	93.0 ± 14.17		
Education				
Read and write	14	94.21 ± 8.74	F= 0.573	0.566
Intermediate education	31	91.16 ± 7.40		
High education	55	91.13 ± 11.38		
Marital Status				
Married	97	91.37 ± 9.60	t= 0.191	0.880
Divorced	1#	104.0		
Widowed	2	95.0 ± 26.87		
Employment				
Housewife	58	91.97 ± 8.74	t= 0.467	0.642
Working	42	91.02 ± 11.44		
Place of residence				
Urban	56	94.48 ± 9.43	t= 0.099	0.921
Rural	44	91.68 ± 10.62		
Monthly household income				
Not enough	28	89.79 ± 9.48	F= 0.240	0.974
Enough	65	92.15 ± 10.15		
Enough and over	7	93.29 ± 9.89		

SD: **Standard deviation** **t: Student t-test** **F: F for One way ANOVA test**
p: p value for comparison between **the studied categories**
*: Statistically significant at $p \leq 0.05$
#: Excluded from the (Relation) due to small number of case (n = 1)

Discussion

Seasonal influenza is a significant public health concern, particularly for vulnerable populations, including pregnant women. Pregnancy induces physiological changes making pregnant women more susceptible to severe influenza complications. Furthermore, research has shown that influenza infection during pregnancy poses substantial risks such as premature birth, congenital defects, foetal discomfort, stillbirth, and stunted growth **Madewell, etal, (2021).** Understanding pregnant women level of knowledge about the disease, its transmission, potential risks, and vaccination prevention strategies is crucial.

The current study showed that overall knowledge score reflecting a moderate level regarding seasonal influenza and its vaccine. This may be due to the pregnant primary sources of information that include media and relatives/friends that might rely on informal or non-medical sources for health information, leading to partial or inaccurate knowledge this opinion matching with **Sales, Syed, Almutairi, & Al Ruthia, (2021)** highlighting the role of media and personal networks in shaping public attitudes and knowledge. Moreover, despite healthcare professional's crucial role in raising awareness and enhancing understanding healthcare professionals serving as the last source of flu vaccine information. The study goes in line with **Dhaouadi et al. (2022)** results in Tunisia that indicates a moderate level of knowledge about the vaccine among pregnant women moreover, study regarding the seasonal influenza vaccine among pregnant women attending antenatal clinics showed that more than half of the study sample demonstrated a sufficient level of knowledge **Maklouf, Aboushady, & Elsharkawy, (2022)** .The study results agree with a recent study conducted on Jordanian women regarding their knowledge and attitudes towards influenza

vaccination during pregnancy yielded several important results the majority of participants (78.1%) demonstrated moderate knowledge about influenza and its vaccine **Barham (2023).**

On the other hand, the study of **Pulatoglu and Turan (2020)** highlighted a significant lack of knowledge and prevalent misconceptions among the participants regarding the safety and necessity of influenza vaccination during pregnancy. This inadequacy in knowledge may be attributed to insufficient information provided by healthcare professionals, government institutions, and media sources

The current study reflects a generally positive attitude towards seasonal influenza and its vaccine in addition to a moderate perception of susceptibility to seasonal influenza, moderate understanding of the potential severity of seasonal influenza, strong recognition of the benefits of the flu vaccine, perceive relatively high barriers to vaccination and moderate level of self-efficacy regarding vaccination. However, the presence of significant variability suggests that while some women are highly motivated, others may still harbor doubts and barriers.

The findings of the current study align with **King et al., (2020),** that highlight attitudes of pregnant women towards the influenza vaccine varied widely. Some expressed strong support for vaccination, citing the protection it offers to both the mother and the unborn child. However, others were hesitant, often due to fears about vaccine safety or a lack of trust in medical recommendations. Moreover**, Wang, Liang, & Chen, (2017)** indicates that seasonal influenza vaccination (SIV) acceptance among pregnant women was positively correlated with relatively high levels of assessed influenza severity and vulnerability, as well as with the perceived advantages of vaccination and strong incentives to action. On the other hand, a negative determinant was the large perceived hurdles to immunzation.

As well the study results of **Maklouf, Aboushady, & Elsharkawy, (2022)** showed half of pregnant women (51.9%) held positive beliefs about receiving the influenza vaccine during pregnancy, indicating a favorable attitude towards vaccination. In addition to only less than one quarter found that (11.2%) of the participants were against maternal influenza vaccination **Shaikh et al., (2024).** As far as attitude goes, 73.8% of respondents felt that the influenza vaccine was helpful and 73.8% thought they were prone to the illness. In terms of obstacles, 50.1% were worried about the negative consequences of the vaccine, and 58.6% wished to avoid getting one. **Barry, Aljammaz, & Alrashed, (2020).**

In reference to the relationship between the knowledge and attitude of women about seasonal flu, the results of this study showed no relationship. On the opposite side **Bruno et al. (2021)** revealed that a significant factor contributing to negative attitudes was a lack of knowledge about the benefits and safety of flu vaccinations. Many participants were not fully informed about how the vaccine could protect both themselves and their unborn children from influenza. Additionally, another study the study illustrates a clear relationship between knowledge and attitudes toward seasonal influenza and its vaccine. Enhanced knowledge leads to more positive attitudes, which in turn increases the likelihood of vaccination uptake among pregnant women **Shaikh et al., (2024).**

The relationship between knowledge and attitudes toward influenza vaccination is significant. Greater knowledge fosters more favorable attitudes, which, in turn, can enhance vaccine uptake among pregnant individuals **McCarron et al., (2024).** Similarly, **Akmatova, Dzhangaziev, Ebama, & Otorbaeva, (2023)** emphasizes that increased knowledge can promote positive attitudes, whereas misconceptions act as barriers to vaccination acceptance. Together, these findings underscore the critical role of education in addressing misconceptions and improving vaccination rates.

Attitudes toward vaccination are influenced by personal beliefs, cultural factors, and access to information. According to **Madewell et al., (2022),** the study found that positive attitudes are closely linked to higher knowledge levels, as women who understand the importance of vaccination are more likely to view it favorably.

One of the key findings of the study revealed a statistically significant relationship between pregnant women's knowledge scores and their educational level, employment status, and place

of residence. Interestingly, however, no significant correlation was observed between their attitudes and sociodemographic factors. This highlights the critical role of education and socioeconomic factors in shaping knowledge, while attitudes may be influenced by other, less tangible variables. Educational background emerged as a key factor, with nearly half of the women (45.6%) having attained primary or secondary education. This highlights the potential influence of education on their knowledge and awareness of the influenza vaccine. Employment status also played a significant role, as a majority (51.9%) of the participants were employed. This suggests a possible link between being part of the workforce and having better access to health information and resources, as noted by **Maklouf, Aboushady, & Elsharkawy, (2022).**

The study by **Shahid et al. (2023)** revealed that pregnant women with a secondary school education or higher demonstrated significantly better knowledge and more positive attitudes toward influenza and its prevention. This finding underscores the strong link between education and awareness, highlighting that higher education levels empower women with the knowledge needed to make informed decisions about vaccination and protect their health. Personal factors, such as occupation and place of residence, significantly shape knowledge and attitudes. For example, women employed in the healthcare sector demonstrate higher levels of knowledge and more positive attitudes compared to their counterparts outside the field. Similarly, women residing in urban areas exhibit better awareness than those in rural communities, highlighting the critical role of access to information and resources in shaping understanding **Alqahtani, & Jahan, (2024).**

Conclusion

According to the study, level of knowledge was moderate among pregnant women regarding seasonal influenza and its vaccine, despite this, pregnant women generally demonstrated a positive attitude towards seasonal influenza and its vaccine, no correlation was observed between pregnant women ' knowledge and attitudes regarding seasonal influenza and its vaccine. The study further identified statistically significant differences in knowledge scores based on education level, employment status, and residence while no significant differences were observed in attitude scores.

Recommendation

The study recommended to improve attitudes and knowledge about seasonal influenza and its vaccine. Develop and implement educational programs about seasonal influenza and its vaccination these programs should be tailored to address gaps in knowledge and provide understandable information to improve vaccination uptake and better public health outcomes. Involve healthcare providers as key educators, equipping them with evidence-based materials to educate pregnant women effectively. Conduct further research to explore barriers to improving knowledge about seasonal influenza and its vaccination, focusing on sociodemographic factors. Investigate additional factors influencing attitudes to identify strategies to maintain or enhance the generally positive perception of vaccination.

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