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Knowledge, Preparedness, and Barriers Toward Receiving Influenza Vaccine Among Students at University of Kufa

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ABSTRACT

Objective: *To assess knowledge, perceived barriers, and willingness toward influenza vaccination among undergraduate students at the University of Kufa, Iraq, to inform targeted health promotion strategies.* ***Method:*** *A cross-sectional descriptive study was conducted from February to March 2025 with 94 convenience-sampled undergraduate students from five colleges at the University of Kufa. Data were collected using a validated 32-item questionnaire assessing demographics, influenza vaccine knowledge, barriers, and willingness. Statistical analyses included descriptive statistics and correlation tests using SPSS.* ***Results:*** *Participants demonstrated moderate knowledge levels: 60.64% had fair knowledge and 39.36% good knowledge regarding influenza vaccination. Most (64.89%) perceived moderate barriers, including misperceptions about vaccine safety, fear of side effects, and accessibility challenges. Willingness to vaccinate was moderate in 58.51% but poor in 38.30% of students. Correlation analysis showed no significant relationships between knowledge, barriers, and willingness, indicating complex factors influencing vaccine acceptance beyond knowledge alone.* ***Novelty:*** *The findings reveal moderate awareness and willingness toward influenza vaccination, tempered by perceived barriers among university students. Vaccine acceptance appears driven by a multifaceted interplay of cognitive, emotional, and structural factors. Tailored, multifactorial interventions combining education, barrier reduction, and improved accessibility are essential to increase vaccine uptake in this population.*

INTRODUCTION

Seasonal influenza remains a significant public health challenge due to its high transmissibility and the substantial morbidity and mortality associated with annual outbreaks. University students are particularly vulnerable to influenza infection given their close living quarters, dense social interactions, and increased risk of spreading the virus within campus settings and the surrounding community [1]. Despite being generally healthy and perceived as low risk for severe complications, influenza vaccination among this population is critical, not only to protect individual health but also to reduce transmission to more vulnerable groups and achieve broader community immunity [1], [2]. However, vaccination rates among university students remain suboptimal globally, often hindered by gaps in knowledge, mixed perceptions, and various barriers to uptake [3], [4]. Understanding these factors is essential for developing effective interventions tailored to this demographic to increase influenza vaccine acceptance and coverage. This study aims to assess university students' knowledge,

perceptions, barriers, and willingness regarding the influenza vaccine to provide insights for designing targeted health promotion strategies.

Understanding the interplay of knowledge, preparedness, and barriers in this demographic is critical. Knowledge defined here as awareness of influenza severity, vaccine safety, mechanisms, and efficacy is foundational to vaccine acceptance. Preparedness reflects both the intention to vaccinate and the logistical readiness such as knowing where to get vaccine and accessibility. Barriers may be cognitive (misperceptions of risk), emotional (fear of side effects or needles), social (peer influence), or structural (cost, time constraints).

For example, [5] surveyed 383 undergraduates and found only 20.6 % reported receiving the vaccine in the prior six months; among non-vaccinated students, 47.8 % believed the vaccine could give them influenza, 41.6 % feared dangerous side effects, and 39.6 % felt they were not at risk which highlighting knowledge gaps and risk misperceptions as prominent barriers.

Ryan et al. conducted a survey of graduate and undergraduate students (N = 1,039) to assess attitudes toward influenza vaccination. The study revealed that 26% of participants overall and 41.6% of those who were unvaccinated held the misconception that the influenza vaccine could actually cause influenza. Additional barriers to vaccination included fear of needles and perceived inconvenience. The findings further indicated that students expressed a preference for receiving vaccine-related information from medical providers Ryan et al.

Study in Saudi Arabia conducted by [6] who used cross sectional assessment of 790 university students (both health science and non-health science). They reported that approximately 70 % had not taken a flu shot before winter, and knowledge levels were suboptimal: only 20.4 % had "good" knowledge, while significant barriers included lack of recommendation from physicians (51.5 %), negative perceptions, and accessibility challenges. Willingness to vaccinate increased substantially up to 70 % when recommended by a physician or if the vaccine were free on campus.

Together, these findings underscore the multifaceted nature of vaccine hesitancy among university students where inadequate knowledge and misconceptions, limited institutional support and logistical hurdles all play contributory roles. To date, however, no study has specifically examined students at the University of Kufa. Understanding their unique context perhaps shaped by regional, cultural, or institutional factors is essential for designing effective interventions.

This study aims to fill that gap by assessing knowledge, preparedness, and barriers toward influenza vaccination among University of Kufa students, thereby informing targeted strategies to enhance coverage in this population.

The research questions posed for this study are:

- What is the level of knowledge among students from different colleges at the University of Kufa regarding influenza vaccine uptake?
- What barriers impede the uptake of influenza vaccination among these students?
- To what degree are students willing to receive the influenza vaccine?

- The last question is: what is the relationship between the study sample and their sociodemographic characteristics?

RESEARCH METHOD

Design of the study:

A cross-sectional descriptive design was carried out from February 7, 2025 to March 23, 2025.

Administrative agreement:

Before collecting data, official approval was obtained from the Department of Nursing Fundamental Nursing Branch College of Nursing/University of Kufa with reference number 3621 dated January 21, 2025. Furthermore, verbal consent of the subject was obtained from participants after the researcher provided brief explanation and study's purpose as well as assured that participation was completely voluntarily and can withdraw at any time and their information will be used for research purposes only.

Setting of the study:

The study was conducted at the University of Kufa, located in Al-Najaf Governorate, Iraq. The University comprises 22 colleges spanning a diverse range of academic disciplines.

Sample of the study:

Nonprobability convenience sample of (94) who were available during the data collection period at University of Kufa. Students who were showing interested to be a part of this study were from five various colleges: College of Sciences, Pharmacy, Nursing, Engineering and Physical Education and Health Sciences

Inclusion criteria:

- Student's age 19 and more
- Male and female students
- Undergraduate students across all academic levels

Exclusion Criteria:

- Students younger than 19 years of age
- Individuals who are not currently enrolled as undergraduate students
- Postgraduate students (e.g., master's, doctoral, or diploma-level students)
- Individuals who have withdrawn or taken a leave of absence from the university
- Students with incomplete academic enrollment

The Study Instrument:

The Arabic version of data collection tool was developed by [6]. The researcher obtained the authors' permission to use in this study.

A structured 32-item questionnaire was developed [6] based on their comprehensive review of established literature in the field. The researchers stated that to ensure content and face validity, the instrument was critically evaluated by a panel of experts, and their constructive recommendations were incorporated into the final version.

The authors mentioned that the instrument's validity was further established through a pilot study conducted with a sample of 30 students. This process confirmed the clarity, comprehensibility, and appropriateness of the questions. In addition, authors assured that the reliability of the questionnaire was confirmed by a Cronbach's alpha coefficient of 0.77, indicating a satisfactory level of internal consistency. However, the final version of instrument is organized into four distinct sections:

Section I: Demographics. This section collects participant characteristics, including age, gender, marital status, field of education, and influenza vaccination history.

Section II: Knowledge Assessment. This segment comprises thirteen true/false statements designed to evaluate knowledge regarding the influenza vaccine. A correct answer is scored '1', while an incorrect or "don't know" response is scored '0', yielding a maximum possible score of 13. Based on established criteria [7], total knowledge scores were categorized into three levels: poor (≤5), fair (6–9), and good (≥10).

Section III: Barrier Identification. This part identifies barriers to influenza vaccine uptake. Eleven barrier items were grouped into five thematic categories: affordability (1 item), accessibility (2 items), negative perceptions (5 items), lack of recommendation (1 item), and religious/cultural restrictions (2 items). Responses were captured on a 5-point Likert scale. For analysis, responses were dichotomized: 'Agree' and 'Strongly Agree' were coded as '1' (indicating the presence of a barrier), while 'Neutral', 'Disagree', and 'Strongly Disagree' were coded as '0'. The maximum barrier score was 11. The percentage of participants agreeing with each statement was calculated, and barriers were ranked to determine their significance, with a specific focus on analyzing negative perceptions [8], [9].

Section IV: Preparedness/ Willingness to Receive Influenza Vaccine. This final section gauges participants' willingness to receive the influenza vaccine through eight questions with 'Yes', 'No', and 'Don't know' response options. Responses were dichotomized for analysis, with 'Yes' coded as '1' and 'No'/'Don't know' coded as '0', resulting in a maximum willingness score of 8. Willingness levels were stratified into three tiers: poor (≤2), moderate (3–5), and good (≥6), adapting methodologies from prior studies [7], [9]

Data collection Procedure:

Convenience samples were used, and students were recruited in person, and the researcher explained the purpose of the study in order to maintain the confidentiality of the participants. Incomplete responses were excluded from analysis to ensure data integrity. All collected data kept in secure place.

Statistical Methods:

All the data in the current study were entered into the SPSS program (version 20). The minimum values, the maximum values, the means, and the standard deviation were calculated. One way ANOVA, and independent t test, were used for quantitative data according to the fulfillment of the conditions required for each test. P - value 0.05 was considered statistically significant.

RESULT AND DISCUSSION

Results

The following tables demonstrate the statistical results for university students' knowledge, barriers and willingness toward influenza vaccine uptake.

Table 1. Distribution of Socio-Demographic Characteristics for the study sample (N = 94).

Socio-Demographic Characteristics	Rating and Intervals	F. (%)
Age Group (Years)	≤ 20	18 (19.15)
	21 - 22	33 (35.11)
	23 ≥	43 (45.74)
Sex	Male	61 (64.89)
	Female	33 (35.11)
Marital status	Single	77 (81.91)
	Married	15 (15.96)
	Divorced	1 (1.06)
	Separated	1 (1.06)
Number of children	No children	81 (86.17)
	1-2	9 (9.57)
	3-4	2 (2.13)
	5 Up	2 (2.13)
Field of study	College of Pharmacy	25 (26.60)
	College of Nursing	15 (15.96)
	College of Engineering	3 (3.19)
	College of Science	21 (22.34)
	College Physical Education and Health Sciences	30 (31.91)
Study stage	First	14 (14.89)
	Second	4 (4.26)
	Third	13 (13.83)
	Fourth	53 (56.38)
	Fifth	10 (10.64)

%= percentage, F. = Frequency.

Table (1) summarize the frequency distribution of the study sample (Students at University of Kufa) by their socio-demographic data. This table explains that most of the students (45.74%) were those in the age's group (23 and more) years old. In addition, the table shows that the high percentages of students (64.89%) were males.

Regarding Marital status, the table shows that (81.91%) of the students were Single and (15.96%) of them were married with (9.57%) of them had 1-2 children.

Concerning the Field of study, the majority of students (31.91% and 56.38%) were studying at Faculty of Sports and Physical Education and at fourth stage.

Table 2. Distribution of flu vaccination Characteristics for the study sample (N = 94).

Socio-Demographic Characteristics	Responses	F. (%)
Received flu vaccination anytime in childhood	Yes	74 (78.72)
	No	20 (21.28)
Routinely make own hospital Appointment	Yes	59 (62.77)
	No	35 (37.23)
Received flu vaccination in the past 3 months (before arrival of winter)	Yes	33 (35.11)
	No	61 (64.89)
Received flu vaccination before joining university	Yes	27 (28.72)
	No	67 (71.28)
Total		94 (100%)

% = percentage, F. = Frequency.

Table (2) summarizes the frequency distribution of the study sample (Students at University of Kufa) by their flu vaccination data. This table explains that most of the students (78.72%) were Received flu vaccination anytime in childhood. In addition, the table shows that the high percentages of students (62.77%) were routinely made own hospital Appointment.

Moreover, the table shows that (35.11%) of the students were Received flu vaccination in the past 3 months (before arrival of winter) and (28.72%) of them were Received flu vaccination before joining university.

Table 3. Assessment of the Students' Knowledge regarding Influenza Vaccination (N =94).

Items	Response	F. (%)	MS (SD)	Assess.
All persons aged 6 months and above should get influenza vaccination annually	Correct	75 (79.79)	1.20 (0.40)	Good
	Incorrect	19 (20.21)		
Influenza vaccination causes mild flu like symptoms	Correct	78 (82.98)	1.17 (0.38)	Good
	Incorrect	16 (17.02)		
Being vaccinated reduces the severity and duration of flu	Correct	90 (95.74)	1.04 (0.20)	Good
	Incorrect	4 (4.26)		
Being vaccinated, improves immunity	Correct	77 (81.91)	1.18 (0.39)	Good
	Incorrect	17 (18.09)		
Infants and immuno-compromised population cannot get influenza vaccination	Correct	46 (48.94)	1.51 (0.50)	Fair
	Incorrect	48 (51.06)		

The complications of influenza can be severe leading to absence from schools and work place, effecting quality of work	Correct	73 (77.66)	1.22 (0.42)	Good
	Incorrect	21 (22.34)		
Severe influenza can lead to hospitalization and even death	Correct	54 (57.45)	1.43 (0.50)	Fair
	Incorrect	40 (42.55)		
Influenza vaccine provides coverage for all types of strains that cause flu	Correct	40 (42.55)	1.57 (0.50)	Fair
	Incorrect	54 (57.45)		
Influenza vaccine reduces the severity and duration of flu for all types of strains	Correct	49 (52.13)	1.48 (0.50)	Fair
	Incorrect	45 (47.87)		
Influenza vaccine is not effective if I already got flu	Correct	44 (46.81)	1.53 (0.50)	Fair
	Incorrect	50 (53.19)		
There are two types of influenza vaccine; intramuscular shot, intra nasal spray	Correct	68 (72.34)	1.28 (0.45)	Good
	Incorrect	26 (27.66)		
The intramuscular influenza "shot" vaccine contains inactivated (killed) virus	Correct	66 (70.21)	1.30 (0.46)	Good
	Incorrect	28 (29.79)		
The intranasal influenza "spray" vaccine (FluMist) contains live attenuated virus	Correct	46 (48.94)	1.51 (0.50)	Fair
	Incorrect	48 (51.06)		
Total		94 (100)		

%= percentage, F. = frequency, M.S: Mean of score, Good (mean of scores 0-1.33), Fair (mean of scores 1.34-1.67), Poor (mean of scores 1.68 and more), SD: Standard Deviation, Assess. Assessment.

Table (3) demonstrates the means of scores and assessment of Students' knowledge regarding Flu vaccination. This table shows that the students recorded good knowledge for items number (1-4, 6, 11 and 12), and all other items were Fair level of knowledge. This assessment is based on the statistical scoring system that indicates the total mean of scores, Good (mean of scores 0-1.33), Fair (mean of scores 1.34-1.67), and Poor (mean of scores 1.68 and more).

Table 4. Overall assessment of Students' knowledge regarding Influenza Vaccination (N=94).

Overall Items	Response	F. (%)	MS (SD)	Assess.
Knowledge of Influenza Vaccination	Poor	0 (0.00)	1.34 (.14)	Fair
	Fair	57 (60.64)		
	Good	37 (39.36)		

Total	94 (100)

%= percentage, F. = frequency, M.S: Mean of score, Good (mean of scores 0-1.33), Fair (mean of scores 1.34-1.67), Poor (mean of scores 1.68 and more), SD: Standard Deviation, Assess. Assessment.

Table (4) demonstrates the overall mean of score and assessment of Students' knowledge regarding Flu vaccination. This table shows that the overall knowledge of Students was Fair level. This assessment is based on the statistical scoring system that indicates the total mean of scores, Good (mean of scores 0-1.33), Fair (mean of scores 1.34-1.67), and Poor (mean of scores 1.68 and more).

Table 5. Perceptions and barriers associated with the uptake of influenza vaccination.

Statement	Responses					MS (SD)	Ass.
	Strongly agree F. (%)	Agree F. (%)	Neutral F. (%)	Disagree F. (%)	Strongly disagree F. (%)		
Affordability							
1.Vaccines are expensive	16(17.02)	17(18.09)	28(29.79)	24(25.53)	9(9.57)	2.93 (1.23)	Moderate
Accessibility							
2.I do not have time to get a flu vaccination	9(9.57)	21(22.34)	25(26.60)	26(27.66)	13(13.83)	3.14 (1.20)	Moderate
3.I do not know where to receive a flu vaccination	6(6.38)	22(23.40)	19(20.21)	32(34.04)	15(15.96)	3.30 (1.18)	Moderate
Negative perceptions							
4.I do not believe that vaccines are effective	5(5.32)	11(11.70)	9(9.57)	36(38.30)	33(35.11)	3.86 (1.18)	High
5.I believe that vaccines may have dangerous side effects	5(5.32)	18(19.15)	25(26.60)	27(28.72)	19(20.21)	3.39 (1.17)	Moderate
6.I believe that flu vaccine causes flu and fever	6(6.38)	33(35.11)	13(13.83)	28(29.79)	14(14.89)	3.12 (1.23)	Moderate
7.I believe I will not get flu	8(8.51)	10(10.64)	19(20.21)	27(28.72)	30(31.91)	3.65 (1.27)	Moderate

8.Flu is seasonal, it will recover on its own	7(7.45)	32(34.04)	25(26.60)	18(19.15)	12(12.77)	2.96 (1.16)	Moderate
Lack of recommendation							
9.I was not recommended to get a flu vaccination by my doctor	29 30.85	32 34.04	19 20.21	4 4.26	10 10.64	2.30 (1.25)	Low
Religious and cultural restrictions							
10.I don't want to get a flu vaccination because of religious reasons	3 3.19	9 9.57	13 13.83	20 21.28	49 52.13	4.10 (1.16)	High
11.I don't want to get a flu vaccination because of cultural reasons	3 3.19	6 6.38	12 12.77	33 35.11	40 42.55	4.07 (1.05)	High

% = percentage, F. = Frequency, M.S: Mean of score, Low (mean of scores 0-2.33), Moderate (mean of scores 2.34-3.67), High (mean of scores 3.68 and more), (SD) = Standard Deviation, Assess. = Assessment.

Table (5) demonstrates the means of scores and assessment of Students Perceptions regarding flu vaccine. This table shows that the students recorded High level of perception for items (4, 10, and 11), Low level of perception for item (9), and all other items were Moderate level of perception.

This assessment is based on the statistical scoring system that indicates the total mean of scores: Low (mean of scores 0-2.33), Moderate (mean of scores 2.34-3.67), High (mean of scores 3.68 and more).

Table 6. Overall Perceptions and Barriers Associated with the Uptake of Influenza Vaccination.

Overall Statement	Response	F. (%)	MS (SD)	Assess.
Overall Perceptions & Barrier	Low	3 (3.19)	3.35 (.53)	Moderate
	Moderate	61 (64.89)		
	High	30 (31.91)		
Total		94 (100)		

%= percentage, F. = frequency, M.S: Mean of score, Low (mean of scores 0-2.33), Moderate (mean of scores 2.34-3.67), High (mean of scores 3.68 and more), SD: Standard Deviation, Assess.: Assessment

Table (6) demonstrates the overall mean of score and assessment of Students' Perceptions regarding flu vaccine. This table shows that the overall Perceptions of Students were Moderate level.

Table 7. Willingness to receive influenza vaccine (N=94).

Statement	Yes	No	Don't know	MS (SD)	Assess.
	F. (%)	F. (%)	F. (%)		
Willingness to get vaccine and justification					
1.I will regularly get a flu vaccine every year (vaccine acceptor)	43(45.74)	16(17.02)	35(37.23)	1.91 (.910)	Moderate
2.I will get a flu vaccine if myself or any of my family member got flu	50(53.19)	32(34.04)	12(12.77)	1.60 (0.71)	High
3.I will get a flu vaccine only if my doctor recommends me	48(51.06)	24(25.53)	22(23.40)	1.72 (0.82)	Moderate
4.I will get a flu vaccine if yearly flu vaccination is made compulsory in National Immunization Program	48(51.06)	30(31.91)	16(17.02)	1.66 (0.76)	High
5.I will get a flu vaccine if it is provided in university campus free of cost	45(47.87)	22(23.40)	27(28.72)	1.81 (0.86)	Moderate
Vaccine type preference					
6.I will get a flu vaccination via intramuscular (IM) shot (injection)	49 52.13	27 28.72	18 19.15	1.67 (0.87)	Moderate
7.I will get a flu vaccination via intranasal mist/spray	45 47.87	26 27.66	23 24.47	1.77 (0.82)	Moderate

%= percentage, F. = frequency, M.S = Mean of score: High (mean of scores 0-1.66), Moderate (mean of scores 1.67-2.33), Low (mean of scores 2.34 and more), SD = Standard Deviation, Assess. = Assessment.

Table (7) demonstrates the means of scores and assessment of students' willingness to receive influenza vaccine. This table shows that the students recorded high level of willingness for items (2, and 4), and all other items were moderate level of willingness.

Table 8. Overall assessment of the students' willingness to receive flu vaccine.

Overall Statement	Response	F. (%)	MS (SD)	Assess.
	Poor	36 (38.30)	1.78 (0.29)	Moderate
	Moderate	55 (58.51)		

Willingness of Receive Flu Vaccine	Good	3 (3.19)
Total		94 (100)

%= percentage, F. = frequency, M.S = Mean of score, High (mean of scores 0-1.66), Moderate (mean of scores 1.67-2.33), Low (mean of scores 2.34 and more), SD = Standard Deviation, Assess. = Assessment.

Table (8) demonstrates the overall mean of score and assessment of Students' willingness to receive influenza vaccine. This table shows that the overall willingness of students was moderate level.

Table 9. Relationship between Socio-Demographic Characteristics of the Students and their overall Knowledge.

Socio-Demographic Characteristics		Knowledge		Statistical Test	P-Value
		Mean	SD		
Age Group (Years)	≤ 20	1.29	.10	**0.901 #**	**0.410 (NS)**
	21 - 22	1.34	.14		
	23 ≥	1.33	.15		
Sex	Male	1.33	.14	**0.025 ψ**	**0.980 (NS)**
	Female	1.33	.13		
Marital status	Single	1.31	.14	**3.002 #**	**0.035 (S)**
	Married	1.37	.11		
	Divorced	1.67	.		
	Separated	1.42	.		
Number of children	No children	1.32	.14	**1.361 #**	**0.260 (NS)**
	1-2	1.37	.12		
	3-4	1.46	.06		
	5 Up	1.42	.35		
Field of study	College of Pharmacy	1.30	.08	**1.513 #**	**0.205 (NS)**
	College of Nursing	1.39	.12		
	College of Engineering	1.25	.08		
	College of Science	1.30	.17		
	College Physical Education and Health Sciences	1.34	.16		
Study stage	First	1.29	.10	**3.124 #**	**0.019 (S)**
	Second	1.38	.11		
	Third	1.24	.18		
	Fourth	1.36	.14		

	Fifth	1.27	.09		

#: Statistics was done using One Way ANOVA, ψ: Statistics was done using independent t-test, NS: non-significant, S: significant.

Table (9) shows a non-significant difference in the Students' Knowledge according to their Socio-Demographic Characteristics, at a p-value of more than 0.05, except Marital status and Study stage; the p-value was less than 0.05.

Table 10. Relationship between sociodemographic characteristics of the students and their overall perceptions and barriers associated with the uptake of influenza vaccination.

Socio-Demographic Characteristics		Knowledge		Statistical Test	P-Value
		Mean	SD		
Age Group (Years)	≤ 20	3.56	.28	3.683 #	**0.029 (S)**
	21 - 22	3.17	.49		
	23 ≥	3.40	.60		
Sex	Male	3.35	.58	0.135 ψ	0.893 (NS)
	Female	3.34	.44		
Marital status	Single	3.33	.53	0.624 #	0.601 (NS)
	Married	3.47	.58		
	Divorced	2.82	.		
	Separated	3.18	.		
Number of children	No children	3.35	.53	0.300 #	0.826 (NS)
	1-2	3.37	.69		
	3-4	3.27	.00		
	5 Up	3.00	.26		
Field of study	College of Pharmacy	3.54	.33	1.617 #	0.177 (NS)
	College of Nursing	3.15	.56		
	College of Engineering	3.18	.36		
	College of Science	3.38	.72		
	College Physical Education and Health Sciences	3.27	.49		
Study stage	First	3.44	.34	2.033 #	0.096 (NS)
	Second	3.34	.66		
	Third	2.99	.48		
	Fourth	3.37	.58		
	Fifth	3.54	.34		

#: Statistics was done using One Way ANOVA, ψ: Statistics was done using independent t-test, NS: non-significant, S: significant.

Table (10) shows a non-significant difference in the Students' Perception and barriers according to their Sociodemographic characteristics, at a p-value of more than 0.05, except for age group; the p-value was less than 0.05.

Table 11. Relationship between Socio-Demographic Characteristics of the Students and their overall willingness to receive flu vaccine.

Socio-Demographic Characteristics		Knowledge		Statistical Test	P-Value
		Mean	SD		
Age Group (Years)	≤ 20	1.82	.36	0.847 #	0.432 (NS)
	21 - 22	1.81	.32		
	23 ≥	1.74	.22		
Sex	Male	1.77	.27	0.366 ψ	0.715 (NS)
	Female	1.80	.33		
Marital status	Single	1.80	.30	2.683 #	0.051 (NS)
	Married	1.63	.14		
	Divorced	2.13	.		
	Separated	2.13	.		
Number of children	No children	1.80	.30	1.087 #	0.359 (NS)
	1-2	1.62	.11		
	3-4	1.75	.00		
	5 Up	1.69	.62		
Field of study	College of Pharmacy	1.86	.28	1.505 #	0.208 (NS)
	College of Nursing	1.68	.24		
	College of Engineering	1.88	.54		
	College of Science	1.83	.26		
	College Physical Education and Health Sciences	1.72	.31		
Study stage	First	1.78	.36	1.960 #	0.107 (NS)
	Second	2.13	.37		
	Third	1.78	.24		
	Fourth	1.74	.27		
	Fifth	1.86	.22		

#: Statistics was done using One Way ANOVA, ψ: Statistics was done using independent t-test, NS: non-significant, S: significant.

Table (11) shows a non-significant difference among students' overall willingness to receive flu vaccine and their Sociodemographic characteristics, at a p-value of more than 0.05.

Table 12. Correlation among knowledge, barrier and willingness using Pearson correlation test (r).

Variables		Knowledge	Barriers	Willingness
Knowledge	r		.047	.132
	Sig.		.654	.206
	N		94	94
Barriers	r	.047		-.039
	Sig.	.654		.712
	N	94		94
Willingness	r	.132	-.039	
	Sig.	.206	.712	
	N	94	94	

Table (12) shows that non-significant statistical Correlation among knowledge, barriers, and willingness, p-vales were more than 0.05 using Pearson correlation test.

Discussion

Universities hold a crucial role not only in fostering academic growth but also in promoting health awareness and preventive health measures among their students. As a significant part of the national population, university students represent a critical group whose engagement in vaccination programs can substantially influence public health outcomes. Their active participation in influenza vaccination initiatives, in particular, has the potential to strengthen herd immunity and reduce the burden of vaccine preventable diseases within the community.

The findings of this study, which examined influenza vaccination rates, knowledge, and perceived barriers among students at the University of Kufa from five colleges, underscore the importance of addressing misconceptions and logistical challenges to improve vaccine uptake. Similar findings reported by Ryan et al., the results indicate that misinformation, such as the belief that the influenza vaccine can cause illness, along with practical deterrents such as fear of needles and inconvenience, remain key barriers to vaccination. These parallels suggest that such barriers are not unique to one population but rather reflect widespread issues across different university settings.

The socio-demographic profile of the participants provides important context for interpreting the findings. The majority of respondents were young adults, with nearly half aged 23 years and above (45.74%), followed by those aged 21–22 years (35.11%). Most were male (64.89%) and single (81.91%), with the vast majority reporting no children (86.17%). These findings align with previous studies emphasizing that younger age groups, particularly university students, often represent a population that is more receptive to health promotion interventions but may also underestimate personal

susceptibility to illness. In terms of academic background, participants were distributed across different colleges, with the highest representation from Physical Education and Health Sciences (31.91%) and Pharmacy (26.60%). This diversity in fields of study may partly explain variations in knowledge and attitudes toward vaccination, as students in health-related disciplines are generally expected to demonstrate higher awareness compared to peers in non-health programs, a trend consistent with earlier research. Furthermore, the majority of respondents were in advanced stages of their studies, with (56.38%) in the fourth year, suggesting that they possess a level of maturity and exposure that could influence their perception of health risks. These socio-demographic characteristics highlight the importance of tailoring educational interventions by considering age, field of study, and academic stage, which has also been noted in prior literature as key factors influencing health knowledge and vaccine uptake.

The socio-demographic data on influenza vaccination behavior reveals key insights supporting the study's findings. Notably, (78.72%) of participants reported receiving the flu vaccine sometime during childhood, which is consistent with previous reports indicating variable but generally suboptimal childhood influenza vaccination coverage globally [10]. This history likely influences their current attitudes toward vaccination uptake. However, only (35.11%) reported receiving the influenza vaccine in the past three months, before the winter season, indicating a gap between past vaccination experience and recent uptake, a trend similarly described among university student populations where seasonal flu vaccination rates remain relatively low despite awareness efforts [11], [12]. Additionally, (62.77%) of participants routinely make their own hospital appointments, suggesting a degree of health self-management and autonomy which is important in vaccine decision-making [13]. Such self-care behaviors among young adults have been shown to correlate with better health outcomes and proactive preventive practices, including vaccination.

These findings correspond with prior peer-reviewed studies that highlight how past vaccination behavior strongly predicts future vaccine acceptance [11]. Moreover, influenza vaccine uptake in university populations is often limited by factors such as perceived severity of illness and convenience, rather than lack of awareness alone, emphasizing the need for targeted interventions [12]. The data underscore the importance of strengthening continual vaccine advocacy and education tailored to young adults who, despite past childhood vaccination, may not consistently maintain seasonal influenza vaccination habits.

The participants' knowledge level regarding influenza vaccination was generally fair to good, with no respondents classified as having poor knowledge, 60.64% exhibited fair knowledge, and 39.36% demonstrated good knowledge. This distribution suggests a moderate awareness about influenza vaccination within the study population, which aligns with similar findings in prior research assessing vaccine knowledge among young adults and university students. For instance, a study by [3] reported that while most university students possess basic awareness of influenza vaccines, detailed understanding often remains limited, highlighting a need for enhanced educational

initiatives. Furthermore, research by [14] indicated that good knowledge about vaccination correlates positively with vaccine acceptance, underscoring the importance of knowledge improvement for increasing vaccine uptake.

The mean score of 1.34 (SD = 0.14) reflects this moderate knowledge level and is consistent with prior studies revealing variability in influenza vaccine literacy among young adults, often influenced by educational background and access to credible health information [15]. These findings reinforce the critical role that targeted health education programs play in addressing knowledge gaps and potentially modifying vaccine attitudes and behaviors in this demographic group.

The findings on overall perceptions and barriers related to influenza vaccination uptake indicate that the majority of participants exhibited moderate levels, with 64.89% classified under moderate perception and barriers, while 31.91% showed high levels and only a small fraction (3.19%) demonstrated low levels. The mean score of 3.35 (SD = 0.53) situates the group's perceptions and barriers clearly within the moderate range, reflecting a nuanced understanding and mixed experiences influencing vaccine acceptance.

These results correspond with earlier studies that highlight how perceived barriers and perceptions significantly impact vaccination behaviors. For example, [16] emphasize that moderate to high perceived barriers such as concerns about vaccine safety, accessibility, and perceived necessity are common among young adults and can hinder vaccine uptake despite awareness. Similarly, a study by [17] reported that individuals with moderate to high vaccine hesitancy often face cognitive and social barriers, which need to be addressed through tailored communication strategies to enhance vaccine acceptance.

The overall assessment of students' willingness to receive the influenza vaccine reveals that a majority demonstrated moderate willingness, with 58.51% categorized in this group, while 38.30% showed poor willingness and only a small minority (3.19%) exhibited good willingness. The mean score of 1.78 (SD = 0.29) places the overall willingness within the moderate range. These findings indicate a mixed readiness among students to accept the influenza vaccine, suggesting that while some recognize the importance of vaccination, a substantial proportion remains hesitant or unwilling.

This pattern is consistent with previous studies that document moderate vaccine willingness among young adults and university populations. For example, [4] found that despite awareness of influenza risks, many students exhibit moderate levels of vaccine acceptance due to concerns about side effects, perceived invulnerability, and lack of motivation. Similarly, [18] observed that vaccine willingness is influenced by knowledge, attitudes, and perceived barriers, with a sizable portion of university students remaining ambivalent or reluctant towards seasonal influenza vaccination.

The Pearson correlation analysis among knowledge, barriers, and willingness to receive the influenza vaccine showed no statistically significant relationships. Knowledge had a very weak positive correlation with willingness ($r = 0.132$, $p = 0.206$) and almost no correlation with barriers ($r = 0.047$, $p = 0.654$). Similarly, barriers had a negligible negative correlation with willingness ($r = -0.039$, $p = 0.712$). These findings suggest that within this

study population, knowledge about influenza vaccination, perceived barriers, and willingness to vaccinate operate relatively independently without strong linear associations.

This pattern aligns with prior research demonstrating that knowledge alone does not necessarily predict vaccination behavior or attitudes. Studies have shown that while education and knowledge can influence vaccine willingness to some extent, other factors including social, psychological, and contextual barriers play critical roles, often moderating or overshadowing the effect of knowledge [16], [19]. For example, some investigations report only weak correlations between knowledge and willingness, indicating that even well-informed individuals may hesitate to vaccinate due to perceived safety concerns, mistrust, or access issues [4], [20].

Therefore, the lack of significant correlations observed here emphasizes the multifactorial nature of vaccine acceptance, suggesting that interventions aimed solely at increasing knowledge may be insufficient. A comprehensive approach that addresses emotional, cultural, and structural barriers alongside knowledge enhancement is essential for effectively improving influenza vaccine uptake.

To sum up, this study reveals a moderate level of knowledge, perceptions, and willingness among university students regarding influenza vaccination, alongside the presence of moderate to high barriers that influence vaccine uptake. The weak and nonsignificant correlations between knowledge, barriers, and willingness suggest that vaccine acceptance is shaped by a complex interplay of factors beyond simple awareness. These findings highlight the need for multifaceted interventions that not only enhance knowledge but also directly address the attitudinal, social, and structural barriers impacting vaccination decisions.

It is recommended that public health authorities and educational institutions implement comprehensive, targeted health promotion strategies that combine evidence-based education with efforts to improve vaccine accessibility and trust. Future research should focus on identifying and mitigating specific cognitive and emotional barriers within this population, as well as assessing the effectiveness of tailored interventions to increase influenza vaccine coverage. Additionally, longitudinal studies could provide deeper insights into changes in vaccine perceptions and behaviors over time to inform sustainable vaccination programs. Such an approach is vital for improving influenza vaccination rates among young adults, ultimately contributing to broader public health goals of disease prevention and control.

CONCLUSION

Fundamental Finding : Participants demonstrated moderate knowledge levels: 60.64% had fair knowledge and 39.36% good knowledge regarding influenza vaccination. Most (64.89%) perceived moderate barriers, including misperceptions about vaccine safety, fear of side effects, and accessibility challenges. Willingness to vaccinate was moderate in 58.51% but poor in 38.30% of students. Correlation analysis showed no significant relationships between knowledge, barriers, and willingness, indicating

complex factors influencing vaccine acceptance beyond knowledge alone. The findings reveal moderate awareness and willingness toward influenza vaccination, tempered by perceived barriers among university students. Vaccine acceptance appears driven by a multifaceted interplay of cognitive, emotional, and structural factors. **Implication :** Tailored, multifactorial interventions combining education, barrier reduction, and improved accessibility are essential to increase vaccine uptake in this population. University health programs should implement comprehensive vaccine promotion strategies addressing knowledge deficits and various attitudinal and logistical barriers to enhance influenza vaccination coverage and support public health goals. **Limitation :** Correlation analysis showed no significant relationships between knowledge, barriers, and willingness, indicating complex factors influencing vaccine acceptance beyond knowledge alone. This suggests that within this study population, knowledge about influenza vaccination, perceived barriers, and willingness to vaccinate operate relatively independently without strong linear associations. **Future Research :** Future research should focus on identifying and mitigating specific cognitive and emotional barriers within this population, as well as assessing the effectiveness of tailored interventions to increase influenza vaccine coverage. Additionally, longitudinal studies could provide deeper insights into changes in vaccine perceptions and behaviors over time to inform sustainable vaccination programs. Such an approach is vital for improving influenza vaccination rates among young adults, ultimately contributing to broader public health goals of disease prevention and control.

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