

Relationship Between Vaccine Confidence and Influenza Vaccination Intention Among Undergraduate Students

Jignisha Tandel[#], Trupti Kalawade[#], Saikrupa Arun^{*}

Department of Biotechnology, Pillai College of Arts, Commerce and Science (Empowered Autonomous), New Panvel, Navi Mumbai, India

*saikrupaarun@mes.ac.in

Abstract

Influenza vaccination is an essential preventive measure against influenza-related illness, though vaccination intention among university students can be highly variable. Vaccine confidence, particularly in vaccine effectiveness and safety and in vaccination authorities, may influence students' vaccination decisions. This study examined the association between vaccine confidence and influenza vaccination intention among undergraduate students using responses to a structured questionnaire. The survey dataset contained 140 submitted responses, with 93 respondents voluntarily agreeing to participate. Vaccine confidence and influenza vaccination intention were represented using composite scores derived from the questionnaire responses. A scatter diagram was used to depict the relationship, and the Pearson correlation coefficient was reported as $r = 0.1646$. The positive coefficient suggests a very weak positive association between vaccine confidence and influenza vaccination intention in the analyzed data. The coefficient of determination, $R^2 = 0.0271$, suggests that approximately 2.71% of the variance in the dependent variable is explained by the linear association with the independent variable. These findings suggest that vaccine confidence might be related to influenza vaccination intention, but the weak magnitude of the association suggests that additional behavioral, social, and contextual factors should also be considered when interpreting students' vaccination decisions.

Keywords — Vaccine confidence, influenza vaccination, vaccination intention, undergraduate students, vaccine hesitancy, Pearson correlation

1. INTRODUCTION

Seasonal influenza poses a significant public health concern because infection can lead to substantial illness and healthcare use. University campuses can facilitate frequent interactions between students in classrooms, accommodation, transport, and social settings. These characteristics make university students a relevant population for influenza prevention research. A systematic review of influenza vaccination among U.S. college and university students reported that vaccination uptake was influenced by students' beliefs, attitudes, recommendations, and support from healthcare providers, family members, and peers [1].

Although influenza vaccines are available widely, vaccination decisions are not solely governed by access alone. Research among college students has identified barriers including fear, insufficient knowledge, perceptions of influenza vaccination as unnecessary, negative social influence, time constraints, and convenience. Facilitators include self-care motivations, positive previous experiences, healthy habits, and trusted recommendations [2].

These findings suggest that psychological and social factors can influence students' willingness to receive influenza vaccination.

Vaccine confidence refers generally to confidence in the safety and effectiveness of vaccines and trust in vaccination-related information and decision-making. Confidence can influence the way individuals interpret information about vaccination and how they assess the benefits and risks of receiving a vaccine. Among university students, attitudes toward influenza vaccination and perceived social expectations have also been associated with vaccination intention [1], [3].

The Theory of Planned Behavior provides a useful framework for understanding vaccination intention through attitudes, subjective norms, perceived behavioral control, and intention. A longitudinal investigation among college students found that attitudes and social norms were important predictors of influenza vaccination intention and that intention was associated with subsequent vaccination behavior [3]. Consequently, the simultaneous examination of vaccine confidence alongside with vaccination

intention may help clarify one component of students decision-making.

The present study therefore investigates the association between vaccine confidence and influenza vaccination intention among undergraduate students. The objective is to determine the direction and strength of the association observed in the collected survey data.

Vaccine-related perceptions can be critical in shaping how university students approach influenza vaccination. Students may consider several aspects prior to deciding whether to receive the vaccine, including their understanding of influenza, beliefs about vaccine safety and effectiveness, previous vaccination experiences, and concerns regarding possible adverse effects. Research conducted among university students has reported that misconceptions about influenza vaccination remain present, while factors such as fear of needles and inconvenience can discourage vaccination. The same study found that students commonly preferred receiving vaccine-related information from healthcare professionals, online sources, and university-based activities, highlighting the importance of reliable information in vaccination decision-making [5].

Vaccination intention is also influenced by factors extending beyond an individual's knowledge or confidence in vaccines. Evidence from a systematic review of university students indicates that vaccination intention can be associated with previous vaccination experiences, knowledge and awareness, perceptions related to vaccination, and recommendations from healthcare professionals. For influenza vaccination specifically, previous receipt of the influenza vaccine has repeatedly been found to be important factor associated with students' intention to be vaccinated [6].

These findings suggest that vaccination intention is a multifactorial behavior and that vaccine confidence should be examined as one component within the broader process of vaccination decision-making.

2. LITERATURE REVIEW

Influenza vaccination among university students has been investigated from behavioural, social and informational perspectives. University students frequently interact in classrooms, residences and other shared environments, making vaccination an

important preventive behaviour in this population. A systematic review of U.S. college and university students reported that vaccination behaviour and intention were associated with individual beliefs as well as interpersonal and institutional influences.^[9]

Vaccine confidence is one component of this decision-making process and includes perceptions of vaccine safety, effectiveness and necessity. Studies among university students have reported concerns about adverse effects, effectiveness and the perceived need for influenza vaccination.^[11] Lack of knowledge, fear, inconvenience and the belief that influenza is not serious enough to require vaccination have also been reported as barriers. Conversely, previous positive vaccination experiences and recommendations from trusted sources may encourage uptake.

Previous vaccination experience and perceived risk appear particularly relevant to vaccination intention. A systematic review and meta-analysis published in 2025 identified previous vaccination history and perceived infection risk among important determinants of influenza vaccination intention in university students^[14]. The same review reported substantial variation between studies, indicating that vaccination intention is influenced by multiple factors rather than a single determinant.

Behavioural theories have also been applied to explain influenza vaccination intention. The Theory of Planned Behavior proposes that attitudes, subjective norms and perceived behavioural control contribute to behavioural intention. Among college students, found that attitudes and social norms were associated with influenza vaccination intention, while intention was associated with subsequent vaccination behaviour.^[3] More recent research among domestic and international college students similarly found significant associations between attitudes, subjective norms, perceived behavioural control and influenza vaccination intention.

Knowledge and information sources may further influence vaccination decisions. Research among university students has identified misconceptions about influenza vaccination and has highlighted healthcare professionals, online resources and university activities as important sources of vaccine information^[11]. Other studies have found associations between influenza knowledge and vaccination

behaviour, although knowledge alone does not necessarily result in vaccination.

Social and practical factors are also important. Studies have reported influences from family members, peers and healthcare professionals, while time constraints, accessibility, cost and convenience may prevent students from acting on their vaccination intentions. Research from China has similarly identified perceived necessity, medical recommendations, previous vaccination and risk perception as factors associated with influenza vaccine hesitancy..

Evidence from different populations also shows that these factors may vary according to context. An Indian study of university students found low H1N1 vaccination uptake and identified concerns about vaccine safety and effectiveness, low perceived risk and information gaps. Studies from China have also examined vaccination intention and behaviour during and after the COVID-19 pandemic, demonstrating that vaccination decisions can change according to the surrounding health context.^[2]

3. MATERIALS AND METHODS

A. Study Design

A cross-sectional survey design was used to examine vaccine confidence and influenza vaccination intention among undergraduate students. Data were obtained from the submitted questionnaire responses provided for this study.

B. Participants

The dataset contained 140 submitted responses. Based on the informed-consent item, 93 respondents indicated that they voluntarily agreed to participate and were considered consent-eligible for descriptive reporting. Among these respondents, 63 (67.7%) were aged 18–20 years, 17 (18.3%) were aged 21–23 years, 6 (6.5%) were aged 24–26 years, 5 (5.4%) were above 26 years, and 2 (2.2%) selected a combined age response. There were 60 female (64.5%) and 33 male (35.5%) respondents. Regarding residence, 50 (53.8%) were from urban areas, 26 (28.0%) from semi-urban areas, and 17 (18.3%) from rural areas.

C. Questionnaire

The questionnaire included statements assessing general vaccine confidence, including perceptions of vaccine effectiveness and safety and confidence in public authorities' vaccine-related decision-making.

Additional items assessed influenza vaccination beliefs, social influences, perceived control, and intention. Responses were recorded using Likert-type response categories.

D. Data Analysis

Composite scores were used to represent vaccine confidence and influenza vaccination intention. A scatter diagram was prepared to depict the relationship between the two composite variables. Pearson's correlation coefficient was used to describe the direction and strength of the linear association. The coefficient of determination was calculated as : $R^2 = (0.1646)^2 = 0.0271$

Thus, the value of $R^2 = 0.0271$ indicates that approximately 2.71% of the variation in the dependent variable is explained by the linear relationship between vaccine confidence and influenza vaccination intention.

4. RESULTS AND DISCUSSION

A. Demographic characteristics

The demographic characteristics of the respondents were analyzed to describe the study population and provide context for interpreting of the findings. The respondents represented different age groups, indicating variation within the undergraduate student population. The distribution of respondents according to age group is presented in Fig. 1. The age distribution provides an overview of the composition of the study sample and helps establish the characteristics of the participants included in the analysis. Understanding the demographic profile is important because attitudes toward vaccination and willingness to receive influenza vaccination may differ between individuals with different personal and social characteristics.

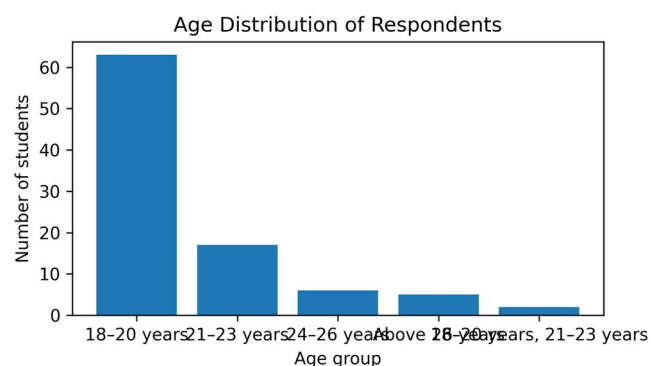


Fig.1.Age distribution of respondents included in the study

B. Vaccine Confidence

The vaccine confidence construct was evaluated through three questionnaire statements about the perceived effectiveness of vaccines, vaccine safety, and confidence in decisions made by public authorities about vaccines.

These are important components of an individual's general confidence in vaccination. The distribution of responses to the three vaccine-confidence items is displayed in Fig. 2.

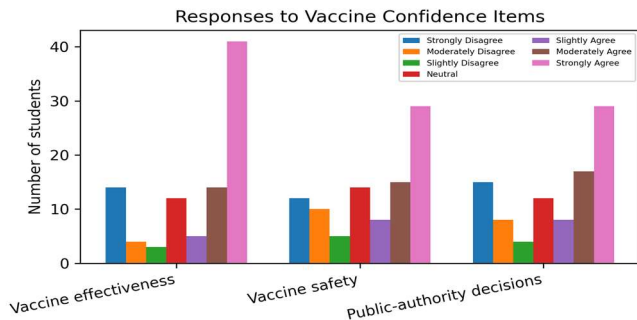


Fig. 2. Distribution of responses to the vaccine confidence items

The responses varied for the participants. Some students showed greater agreement towards the effectiveness and the safety of the vaccines while others chose neutral or negative responses. Similarly, variations were noted for the level of confidence in the public authorities and their decisions with regards to vaccination. This implies that vaccine confidence is not consistent amongst undergraduate students and that the perceptions could be different amongst the same student population.

C. Influenza vaccination intention

The intention towards influenza vaccination was analysed through the statement, "I plan on getting the flu vaccine this year." The responses varied across different levels of agreement, implying the variation in students willingness to receive influenza vaccination. The distribution of vaccination intention among the respondents is displayed in Fig.3.

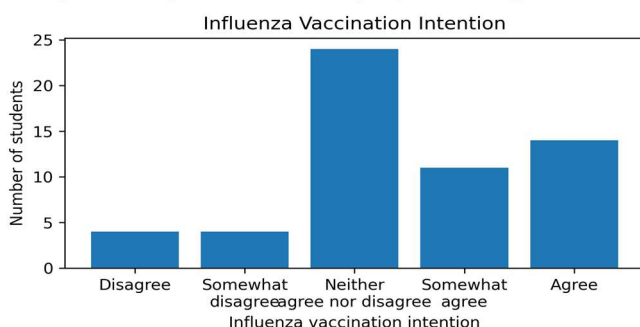


Fig. 3. Distribution of influenza vaccination intention among respondents

The observed variation indicated that the respondents did not share the same level of intention to receiving influenza vaccination. Some students expressed agreement to receiving the vaccine whereas others reported disagreement or neutrality. This differs in intention to receiving the vaccine since vaccination intention represents an individual's willingness or planned behaviour to receive the influenza vaccine

D. Relationship Between Vaccine Confidence and Influenza Vaccination Intention

The relationship between vaccine confidence and influenza vaccination intention was evaluated through Pearson correlation analysis. The scatter plot in Fig. 4 displays the distribution of individual observations and the overall direction of the relationship between the two variables.

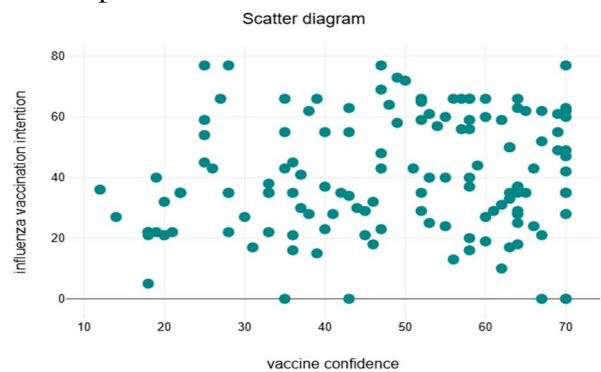


Fig. 4. Relationship between vaccine confidence and influenza vaccination intention.

The Pearson correlation coefficient derived from the analysis is $r = 0.1646$. The positive value implies there is a positive relationship between vaccine confidence and influenza vaccination intention. This means that students with higher vaccine confidence reported slightly higher intention to receiving influenza vaccine. However, the correlation coefficient is relatively close to zero to imply that the relationship is very weak.

The scatter plot further shows this since observations are widely distributed rather than be tightly-clustered around a single increasing line. Although the overall trend is positive, the large quantity of variation between individual observations implies that vaccine confidence does not strongly correspond with influenza vaccination intention in this sample.

E. Discussion

The results of this study showed that there was a positive but very weak relationship between vaccine confidence and influenza vaccination intention amongst the undergraduate students. The Pearson correlation coefficient is $r = 0.1646$, which implies that students with higher vaccine confidence exhibited slightly higher intention to receiving the influenza vaccine. However, the strength of the relationship was low. The result therefore implies that having confidence in vaccine safety, effectiveness and public-authority decisions does not necessarily mean that a student will have a strong intention to receive the influenza vaccine. This is also supported by previous studies showing that vaccination decisions amongst college students are influenced by several different factors^{[1], [3]}.

The possible reasons for the weak relationship are that students may be considering other things when deciding whether to receive an influenza vaccine. Some students may not feel that they are at high risk of getting influenza or may not think that influenza vaccination is necessary every year. Previous experiences with vaccination, advice from healthcare professionals, family and friends, and concerns about side effects may also influence their decision. Practical issues such as the availability and convenience of vaccination services can also make a difference, in addition to this smaller sample size is also the reason as only 93 out of 140 people agreed to participate which possibly caused weakened correlation calculation.

Overall, the findings show that vaccine confidence is only one part of the decision-making process related to influenza vaccination. Providing students with clear information about vaccine safety and effectiveness may improve understanding but other concerns and practical barriers may also need to be addressed. Universities could consider combining health education with convenient access to influenza vaccination and information from trusted healthcare professionals. Since this study was based on a cross-sectional survey the relationship found in the study does not prove that vaccine confidence causes vaccination intention. The future studies could include a larger number of students and examine other factors such as previous influenza vaccination, perceived risk of influenza, sources of health information, and access to vaccination services.

5. CONCLUSION

This study explored the link between vaccine confidence and influenza vaccination intention among undergraduate students. Results showed a weak positive correlation ($r = 0.1646$, $R^2 = 0.0271$), meaning confidence explained only a small part of students' willingness to vaccinate. While trust in vaccines plays a role, other influences such as past experiences, knowledge of influenza, safety concerns, perceived risk, social opinions, and practical factors like cost and convenience also shape decisions. Universities can support informed choices by offering clear information and accessible on-campus vaccination services. Future research with larger, more diverse samples should examine additional factors—such as prior vaccination history, perceived susceptibility, and healthcare access—to build stronger strategies for promoting influenza vaccination among students..^{[1]-[4]}

ACKNOWLEDGMENT

The authors would like to thank all students who voluntarily participated in the survey and contributed their responses to this study.

REFERENCES

- [1] E.-J. Shon, S. Choe, L. Lee, and Y. Ki, "Influenza Vaccination Among U.S. College or University Students: A Systematic Review," *American Journal of Health Promotion*, vol. 35, no. 5, pp. 708–719, 2021, DOI:[10.1177/0890117120985833](https://doi.org/10.1177/0890117120985833)
- [2] Z. Su and Y. T. Chen, "College students' influenza vaccination adoption: Self-reported barriers and facilitators," *Journal of American College Health*, vol. 71, no. 2, pp. 522–527, 2023, DOI:[10.1080/07448481.2021.1898401](https://doi.org/10.1080/07448481.2021.1898401)
- [3] P. A. Mongeau, Y. Liu, E. C. Hashi, and A. J. Roberto, "College students' influenza vaccine hesitation: a reasoned action investigation with quantitative and qualitative data," *Journal of Behavioral Medicine*, vol. 46, pp. 65–75, 2023, DOI:[10.1007/s10865-022-00310-9](https://doi.org/10.1007/s10865-022-00310-9)
- [4] H. Zou, Y. Huang, T. Chen, and L. Zhang, "Influenza vaccine hesitancy and influencing factors among university students in China: A multicenter cross-sectional survey," *Annals of Medicine*, vol. 55, no. 1, p. 2195206, 2023,

DOI:[10.1080/07853890.2023.2195206](https://doi.org/10.1080/07853890.2023.2195206)

[5] K. A. Ryan, S. L. Filipp, M. J. Gurka, A. Zirulnik, and L. A. Thompson, “Understanding influenza vaccine perspectives and hesitancy in university students to promote increased vaccine uptake,” *Heliyon*, vol. 5, no. 10, p. e02604, 2019.

DOI: [10.1016/j.heliyon.2019.e02604](https://doi.org/10.1016/j.heliyon.2019.e02604)

[6] I. Mussetto, M. C. Bernucci, C. Isonne, et al., “University students’ predictors of vaccine intention toward routine vaccination: a systematic review,” *European Journal of Public Health*, vol. 33, Supplement 2, 2023, article ckad160.1413.

DOI:[10.1093/eurpub/ckad160.1413](https://doi.org/10.1093/eurpub/ckad160.1413)

[7] Y. Yu, Y.-L. Ma, S. Luo, S. Wang, J. Zhao, G. Zhang, L. Li, L. Li, and J. T.-F. Lau, “Prevalence and factors of influenza vaccination during the COVID-19 pandemic among university students in China,” *Vaccine*, vol. 40, no. 24, pp. 3298–3304, 2022, DOI: [10.1016/j.vaccine.2022.04.077](https://doi.org/10.1016/j.vaccine.2022.04.077).

[8] C.-C. Liu, A. C.-C. Chen, J. Ling, C. Liu, N. Zahry, R. Ammigan, and L. Kaur, “Determining the intention of receiving the influenza vaccine: A cross-sectional survey among international and domestic college students in the USA,” *BMJ Open*, vol. 14, no. 12, e085377, 2024.

DOI: [10.1136/bmjopen-2024-085377](https://doi.org/10.1136/bmjopen-2024-085377)

[9] R. A. Bednarczyk, S. L. Chu, H. Sickler, J. Shaw, J. A. Nadeau, and L.-A. McNutt, “Low uptake of influenza vaccine among university students: Evaluating predictors beyond cost and safety concerns,” *Vaccine*, vol. 33, no. 14, pp. 1659–1663, 2015.

DOI: [10.1016/j.vaccine.2015.02.033](https://doi.org/10.1016/j.vaccine.2015.02.033).

[10] A. J. Roberto, P. A. Mongeau, Y. Liu, and E. C. Hashi, “‘Fear the flu, not the flu shot’: A test of the extended parallel process model,” *Journal of Health Communication*, vol. 24, no. 11, pp. 829–836, 2019, DOI: [10.1080/10810730.2019.1673520](https://doi.org/10.1080/10810730.2019.1673520).

[11] P. S. Suresh, V. Thejaswini, and T. Rajan, “Factors associated with 2009 pandemic influenza A (H1N1) vaccination acceptance among university students from India during the post-pandemic phase,” *BMC Infectious Diseases*, vol. 11, p. 205, 2011, DOI: [10.1186/1471-2334-11-205](https://doi.org/10.1186/1471-2334-11-205).

[12] Li, L., Yang, L., Wang, Q., Wood, C. E., Kostkova, P. (2023). Comparing factors influencing

seasonal influenza vaccine acceptance and intentions among Chinese university students residing in China and UK: A cross-sectional study. *Human Vaccines & Immunotherapeutics*, 19(3), 2290798. DOI: [10.1080/21645515.2023.2290798](https://doi.org/10.1080/21645515.2023.2290798).

[13] Y. Wang, G. Wu, Y. Jiang, F. Zou, L. Gan, Q. Luo, X. Wu, and X. Tang, “Does COVID-19 have an impact on influenza vaccine knowledge, attitude and practice among medical students: A 2-year prospective cohort study,” *BMJ Open*, vol. 12, no. 9, e055945, 2022, DOI: [10.1136/bmjopen-2021-055945](https://doi.org/10.1136/bmjopen-2021-055945)

[14] F. S. Alnezary, R. A. Alhejaili, A. A. Alayashi, D. S. Alnizari, N. S. Bin Mirdhah, S. K. Alrays, et al., “Risk perception and influenza vaccine hesitancy among university students in Saudi Arabia,” *Frontiers in Pharmacology*, vol. 17, p. 1747976, 2026,. DOI: [10.3389/fphar.2026.1747976](https://doi.org/10.3389/fphar.2026.1747976).

[15] Y. Chae, S. Kim, and S. Yang, “Factors related to influenza vaccination intention in university students based on theory of planned behavior,” *Journal of Health Informatics and Statistics*, vol. 46, no. 1, pp. 64–71, 2021,. DOI: [10.21032/jhis.2021.46.1.64](https://doi.org/10.21032/jhis.2021.46.1.64).