

Knowledge and Attitude of Healthcare Workers and the Public Regarding the COVID-19 Pandemic: An Original Research

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ABSTRACT:

Introduction: Vaccination is one of the effective measures to prevent COVID-19, but the vaccination acceptance varies across countries and populations. Hence we aim to investigate nursing students' knowledge, attitudes and willingness to receive the COVID-19 vaccine, and the influencing factors.

Material and methods: We conducted a cross-sectional survey of nursing students via online questionnaires in March 2021. Descriptive statistics, independent sample t tests/one-way ANOVA (normal distribution), Mann-Whitney U tests/Kruskal-Wallis H tests (skewness distribution) and multivariate linear regression were performed.

Results: The score rate of attitude, knowledge and vaccination willingness were 70.07%, 80.70% and 84.38% respectively. Attitude was significantly influenced by family economic conditions and whether a family member had been vaccinated. The main factors influencing knowledge were gender, grade and academic background. In terms of willingness, gender, academic background, visits to risk areas, whether family members were vaccinated, and whether they had side effects were significant influencing factors.

Conclusions: The vaccine acceptance of nursing students was fair. Greater focus needed to be placed on the males, those of younger age, with a science background, and having low grades, as well as on students whose family members had not received the COVID-19 vaccine or had side effects from the vaccine. Targeted intervention strategies were recommended to improve vaccination rates.

Keywords: COVID-19 vaccine, Attitudes, Knowledge, Willingness, Nursing students

INTRODUCTION

The COVID-19 pandemic is a global public health crisis that has seriously impacted the international community. Vaccination is one of the most effective and low-cost measures to prevent COVID-19.¹⁻³ Currently, nine COVID-19 vaccines have been approved for marketing worldwide, and as of March 15, 2021, more than 360 million doses of COVID-19 vaccines have been globally administered (WHO, 2021). However, studies have shown that the willingness to be vaccinated varies across countries and populations after the introduction of the COVID-19 vaccine and is influenced by a number of factors. Vaccines with high effectiveness, long protection periods, and low incidence of adverse reactions were easily accepted by the population.⁴⁻⁷ Among healthcare workers, the vaccine acceptance rate ranged from 23.4% in Taiwan to 95% in the Asia-Pacific region.⁸⁻¹⁰ Furthermore, as students, if they have good vaccination attitudes and behaviors, they can set an example for other faculty students to improve the COVID-19 vaccination rate. Therefore, it is significant to understand nursing students' perceptions, attitudes, vaccination intentions, and related influencing factors

of COVID-19 vaccines, which can assist educational institutions in developing effective interventions to increase vaccination rate. Upon reviewing the existing literature, we found that only a few studies have been conducted on college students' vaccination intentions, with nursing college students being rarely studied; thus, an investigation is imperative.^{11,12} The aim of this cross-sectional study was to investigate Chinese nursing students' knowledge, attitudes, and vaccination intentions toward the COVID-19 vaccine and to examine potential influencing factors to provide evidence for developing intervention strategies and improving vaccination rates.

MATERIAL AND METHODS

We selected the nursing college students by the cluster sampling method. This study was a cross-sectional electronic survey. In this survey, a total of 15 basic information items and 3 questionnaire dimensions were covered, giving rise to 31 variables for statistical analysis. Basic information (14 items): gender, age, grade, family status and vaccination experience, etc. Attitude of the COVID-19 vaccine (11 items): influences of COVID-19, risk perception, vaccine acceptance, concern about the vaccine, etc. Each item was rated on a 5-point Likert scale and the total score ranged from 11-55, with a higher total score indicating more positive attitude. Knowledge of the COVID-19 vaccine (9 items): (a) inoculation methods, suitable population, contraindications, adverse reactions, etc. The answer options included single choice and multiple choice. Each correct answer of single choice questions scored 5 and multiple choice questions scored 1 for each correct choice. The total score ranged from 1 to 46, with a higher total score indicating a better mastery of knowledge. (b) Knowledge sources included mobile phone, TV, radio, network, newspaper, school/community pamphlet/bulletin board, relatives/friends introduce and others. Vaccination Willingness (10 items): vaccine selection, vaccination form, willingness, reason, etc. Vaccination willingness was scored by 6-point Likert, the higher the score, the stronger the vaccination intention. The rest of the items were objective which described as percentages. The statistical analysis was done by appropriate statistical tools after the data was recorded.

RESULTS

A total of 1,488 valid copies were finalized for the study. The demographics of the study population that accounted for the majority were female (84.27%), between 21 and 22 years of age (23.99%), class of 2020 (42.14%), had a bachelor's degree (82.93%), from a science background in high school (60.15%), had parental family living in a new community (30.98%), had no history of travel to areas above medium risk in the past six months (99.26%). Attitude, willingness and total scale scores were normal distribution, and knowledge scores were skewed distribution. The mean score of the attitude dimension was 38.54 ± 4.48 and the score rate was 70.07%. In the attitude dimension, the highest score was for Infection with COVID-19 has a high impact on the surrounding people or environment. (88.80%), while the lowest score was for Perceived high risk of infection with COVID-19. (49.20%). The score rate in the knowledge dimension was 80.70%. In the knowledge dimension, contraindications for the COVID-19 vaccine (89.40%) had the highest score, while correct method of vaccination (63.75%) had the lowest score. The mean score of willingness to be vaccinated was 6.75 ± 1.07 with a score rate of 84.38%. The top three reasons for willingness to be vaccinated were as follows: responding to the national call (87.57%), believing in the vaccine (61.09%), and organizing group vaccinations at school (60.69%). The top three reasons for unwillingness to be vaccinated were as follows: worrying about the side effects of the vaccine (51.14%), the vaccine had just been introduced and its effect was unclear (42.41%), and observing the effect of vaccination on others (34.54%). In terms of vaccine selection, students were more willing to choose domestic vaccines

(58.94%), and they hope that units or schools will organize collective vaccination (88.78%). The desired vaccine protection periods was more than 10 years (40.39%). Even with fees, 74.46% of students were still willing to be vaccinated, and the top three acceptable vaccine prices were within 50 RMB (40.99%), 5-100 RMB (36.29%), and 100-300 RMB (19.22%). (Table 1)

The main factors influencing knowledge were gender, grade and academic background. Regarding the willingness to be vaccinated, gender, academic background, visits to areas above medium risk in the past six months, whether family members were vaccinated, and whether family members experienced side effects after receiving other vaccines were significant influencing factors.

Table 1 Scores of attitude, knowledge and willingness of COVID-19 vaccine (N = 1488)

Dimension	Item	Score range	Mean (SD)	P50 (P25, P75)	Scoring rate (%)
Attitude		11-55	38.54±4.48		70.07
	Do you think that contracting COVID-19 has a significant impact on your health?	1-5	3.88±1.17		77.60
	Do you think it will affect the people around you or the environment if you get COVID-19?	1-5	4.44±0.84		88.80
	Do you think the current outbreak is serious?	1-5	3.18±0.81		63.60
	Do you think the outbreak will recur in China?	1-5	3.21±1.00		64.20
	How much has the outbreak affected your life in the past 5 months?	1-5	3.54±0.88		70.80
	How much is the outbreak expected to affect your life in the next 5 months?	1-5	2.99±0.81		59.80
	Do you think you are at high risk of contracting COVID-19 ?	1-5	2.46±0.94		49.20
	Do you think you can prevent COVID-19 by vaccination?	1-5	3.77±0.62		75.40
	Do you think the vaccines available on the market today are safe?	1-5	3.58±0.66		71.60
	Do you think the vaccine is effective?	1-5	3.66±0.62		73.20
Knowledge	How much do you care about vaccine-related information?	1-5	3.82±0.79		76.40
		1-46		39(35, 42)	80.70
	Do you know who are the priority groups for vaccination?	0-8		8(8,8)	89.00
	What is the recommended age group for the vaccination?	0/5		4(4, 4)	79.60
	What is the correct method of vaccination?	0-8		5(4, 7)	63.75
	What are the contraindications for the vaccine?	0-5		5(5,5)	89.40
	What are the correct adverse reactions to vaccination?	0-5		5(4,5)	86.00
	Vaccination precautions	0-5		5(5,5)	88.40

DISCUSSION

This study, through a literature review, group discussion, and consultation with experts, constructed an attitudes, knowledge, and willingness (AKW) scale in terms of acceptance of the COVID-19 vaccine. The content validity of the scale was 0.98 and the Cronbach's a coefficient was 0.71, indicating that the scale has some reliability. The AKW score in this study was 82.41±8.50, which was in the range of 14-109, indicating that nursing students had a positive perception of the COVID-19 vaccine and were willing to receive it.

Attitudes

Low score items in the attitude dimension were Do you think the current outbreak is serious? (63.60%), Do you think the outbreak will recur in India? (64.20%), How much is the outbreak expected to affect your life in the next 5 months? (59.80%) and Do you think you are at high risk of contracting COVID-19? (49.20%). The related fact is that the pandemic is now better controlled in India, leading to students being less vigilant due to beliefs that the pandemic will not recur and that the chance of infection is small. This suggest that the acceptance of the vaccine was lower when the perceived severity and fear of COVID-19 were lower which is in agreement with the existing literature.¹⁰⁻¹⁷ Kwok et al. (2021)²² found that

hospital nurses' willingness to be vaccinated against COVID-19 declined after the situation regarding COVID-19 pandemic tended to improve. Therefore, it is recommended that schools should strengthen education regarding the COVID-19 vaccine and highlight the importance of vaccination among students, while accelerating the vaccination process with full respect for students' vaccination willingness, to be able to increase vaccination rates.¹⁸⁻²⁰ Although the risk of the pandemic is perceived as low, students also believe that once they infect COVID-19, it can have a significant impact on them personally and their surroundings.

Knowledge

The scoring rate of knowledge dimension was 80.70%. Item analysis showed that out of the 7 knowledge items, 5 items (contraindication of vaccination, key vaccinated groups, precautions after vaccination, herd immunity, adverse reactions) scored at a rate of more than 80%, indicating that most students had a good grasp of the knowledge of COVID-19 vaccine. However, the relatively low scoring items of the correct way to vaccinate (63.75%) and the recommended age group for the vaccination (79.60%) suggested that these were weak points that needed to be strengthened. In the correct method of vaccination item, adenovirus vaccines and recombinant vaccine inoculation methods served the lowest. Only 40.39% of the students could clearly point out that nucleic acid testing was not necessary before vaccination, while most of the students believed that nucleic acid testing was necessary. 69.83% of the students believed that the age group suitable for vaccination was 18-60 years old. However, according to the latest guidelines issued by the National Health Commission of China, the recommended age for vaccination has been revised to be above 18 years old, which suggested that the knowledge students have mastered should be updated in time.¹⁹⁻²³

College students are an important group for epidemic prevention. Grade, gender and high school background were significant predictors of knowledge. Girls can master better knowledge than boys. This gender difference may have something to do with nursing profession as presented by Albaqawi et al., 2020³, or with gender itself as given by Zhong et al., 2020¹⁰. Therefore, nursing education must ensure that students of all grades and genders have equal access to student-centered COVID-19 resources to prevent knowledge biases among students.

Vaccination willingness

Among the 1,488 students interviewed, the scoring rate of vaccination willingness was 5.00 ± 0.85 (83.33%), which was in the middle-to-upper level compared with existing studies, indicating that nursing students were more willing to be vaccinated. The analysis of the reasons for willingness/unwillingness to be vaccinated showed that nursing students could have a certain degree of understanding of the necessity, effectiveness, and safety of the COVID-19 vaccine based on their professional foundation. According to the results of the regression analysis, sex, academic background, visits to areas above medium risk in the last six months, whether family members were vaccinated, and whether they had side effects after vaccination were significant influencing factors for the vaccination willingness. In this study, the vaccination willingness of female students was significantly higher than that of male students, which is inconsistent with part of existing studies⁹. In this study, the vaccination rate of family members of the surveyed students was 40.66% (605/1488), and the incidence of adverse reactions was 6.12% (37/605), which was higher than the median incidence of adverse reactions in existing studies (0.1-15.8%).⁷ Therefore, students may have negative cognition in vaccination.

There are some limitations to this study. The sample of this study was mainly taken from two undergraduate schools having mostly nursing undergraduates and was based on the enrollment level of the schools as well as the students' willingness to fill out the survey; thus,

the results need to be interpreted with caution.

CONCLUSION

The vaccine acceptance of nursing students was fair. Greater focus needed to be placed on the males, those of younger age, with a science background, and having low grades, as well as on students whose family members had not received the COVID-19 vaccine or had side effects from the vaccine. Targeted intervention strategies were recommended to improve vaccination rates.

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