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Abstract

Background: The preferences for features of influenza vaccination programs among clinicians practicing traditional Chinese medicine (TCM) and modern western medicine (WM) remained unknown.

Objective: To understand preferences for features of influenza vaccination programs among clinicians practicing traditional Chinese medicine (TCM) and modern western medicine (WM).

Methods: We conducted a discrete choice experiment with national sample of 3,085 Chinese clinicians from various level of hospital (n = 1013 practicing TCM). Simulations from choice models using the experimental data generated the coefficients of preference, and predicted uptake rate of different influenza vaccination programs. Clinicians were grouped by vaccine preference classification through a latent class analysis.

Results: All attributes included are significantly influencing clinicians' preference for choosing influenza vaccination. An approximate hypothetical 60% increase could be obtained when the attitude of the workplace changed from "no-notice" to "encouraging of vaccination"; there was an approximate hypothetical 35% increase when vaccination campaign strategies changed from "individual appointment" to "vaccination in a workplace setting". In the entire sample, about 30% of clinicians prefer free vaccination, while 26% comprehensively consider attributes. Clinicians that practicing TCM, work in tertiary hospital, or have at least postgraduate degree exhibit a lower preference for free vaccination. Clinicians that practicing WM, work in primary hospital, or have at most bachelor's degree a higher preference for workplace vaccinations.

Conclusions: Offering a range of influenza vaccination programs targeting the preferred attributes of different clinician groups could potentially encourage more individuals to participate in influenza vaccination programs and assist in addressing influenza vaccine hesitancy. Clinical Trial: Zhejiang Chinese Medical University Ethics Committee reviewed and approved this protocol and informed consent was obtained from each participant (No.20221021–1).

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ABSTRACT

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OBJECTIVES

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Offering a range of influenza vaccination programs targeting the preferred attributes of different clinician groups could potentially encourage more individuals to participate in influenza vaccination programs and assist in addressing influenza vaccine hesitancy.

Key words

Influenza vaccination program; traditional Chinese medicine; Clinicians

Introduction

Annual seasonal influenza epidemics result in 290,000–650,000 deaths worldwide[1]. In China, it has been estimated that circulating influenza viruses are associated with 2.5 excess influenza-like-illness consultations per 1,000 person-years and over 88,000 preventable deaths annually[2] . Influenza viruses not only cause high levels of morbidity and mortality seasonally each year, but also present a significant hospital management threat. During influenza seasons, health care workers are at high risk of infection, leading to economic loss and potentially causing staff shortages[3]. HCWs may be asked or pressured to work despite having an influenza infection, contributing to clinic- or hospital-acquired influenza transmission[4]. Influenza vaccination is the most cost-effective measure to protect high-risk groups against severe influenza-associated diseases and deaths, and the World Health Organization (WHO) recommends influenza vaccination in particular for specific target groups including HCWs, individuals with comorbidities and underlying conditions, the elderly, children, and pregnant women[5].

However, despite efforts to promote influenza vaccination among HCWs, uptake rates remain unsatisfactory in China. In the 2019/2020 season, only 61% of Chinese clinicians got vaccinated compared to 87.9% in Finland and 91.3% in United States[6, 7, 8]. Barriers to influenza vaccine uptake among healthcare workers in China include out-of-pocket costs and workplace regulations. Previous study indicated that the

clinicians have a crucial influence on vulnerable populations, and clinicians who get vaccinated was more likely to recommend their patients to get vaccinated, which highlighting the importance of this group in increasing uptake rate[9].

Amongst the earliest health systems in human history, the Traditional Chinese medicine (TCM) is a fully institutionalized composition of China health care systems and has been adopted to many regions such as Asia, Europe and north America[10]. China is the only country where western medicine (WM) and TCM collaborated at each level of healthcare systems. Emphasis on both TCM and WM is the consistent policy of Chinese health system[11]. In 2020, there were 682,770 registered TCM clinicians, accounting for 16.7% of all clinicians in mainland China, provided medical service for over 1 billion outpatients and 35 million hospitalizations[12]. Clinicians practicing TCM have their unique treatment principles and practical approaches, and little is known about what drives their preference for influenza vaccination. Considering the substantial medical service provided by TCM clinicians, it is vital to identify what drive their preference in getting vaccinated.

We conducted a nationwide survey using a discrete choice experiment (DCE) among both TCM and WM clinicians, to capture their stated preferences regarding influenza vaccination programs. The study's objective was to investigate how different characteristics of influenza vaccination programs influenced clinicians' vaccination decisions, including differences in preferences between TCM and WM clinicians. Additionally, we explored potential preference classes across demographic characteristics of clinicians to present the distribution of preferences.

Methods

Participants

Clinicians (both TCM and WM) holding a current practicing license in a hospital or community health service center, as of the date of survey administration, were included as potential participants. Data were collected through stratified random cluster sampling between January 10 and May 10, 2022. In China, coastal region (Eastern) and inland region (Central and Western) were stratified according to geographical location and

socioeconomic development. The 3 tertiary hospitals, 3 secondary hospitals and 18 primary hospitals were randomly selected as survey spots in the coastal region and the inland region, respectively. Geographic distribution of all the participants were presented in supplementary figure 1. Each hospital established a messaging group through WeChat (a free messaging and calling app) that included all the clinicians who worked in the hospital. Hospital administrative staff and local health bureaus delivered the online questionnaire link to these WeChat groups. Participants who completed the questionnaire and correctly answered two quality control questions (a simple math problem and a pros-and-cons question where one choice is better than the other) were rewarded with a modest monetary incentive. After sampling, we adjusted the WM clinicians sample using propensity score matching method to ensure comparability between TCM clinicians and WM clinicians (Fig 1).

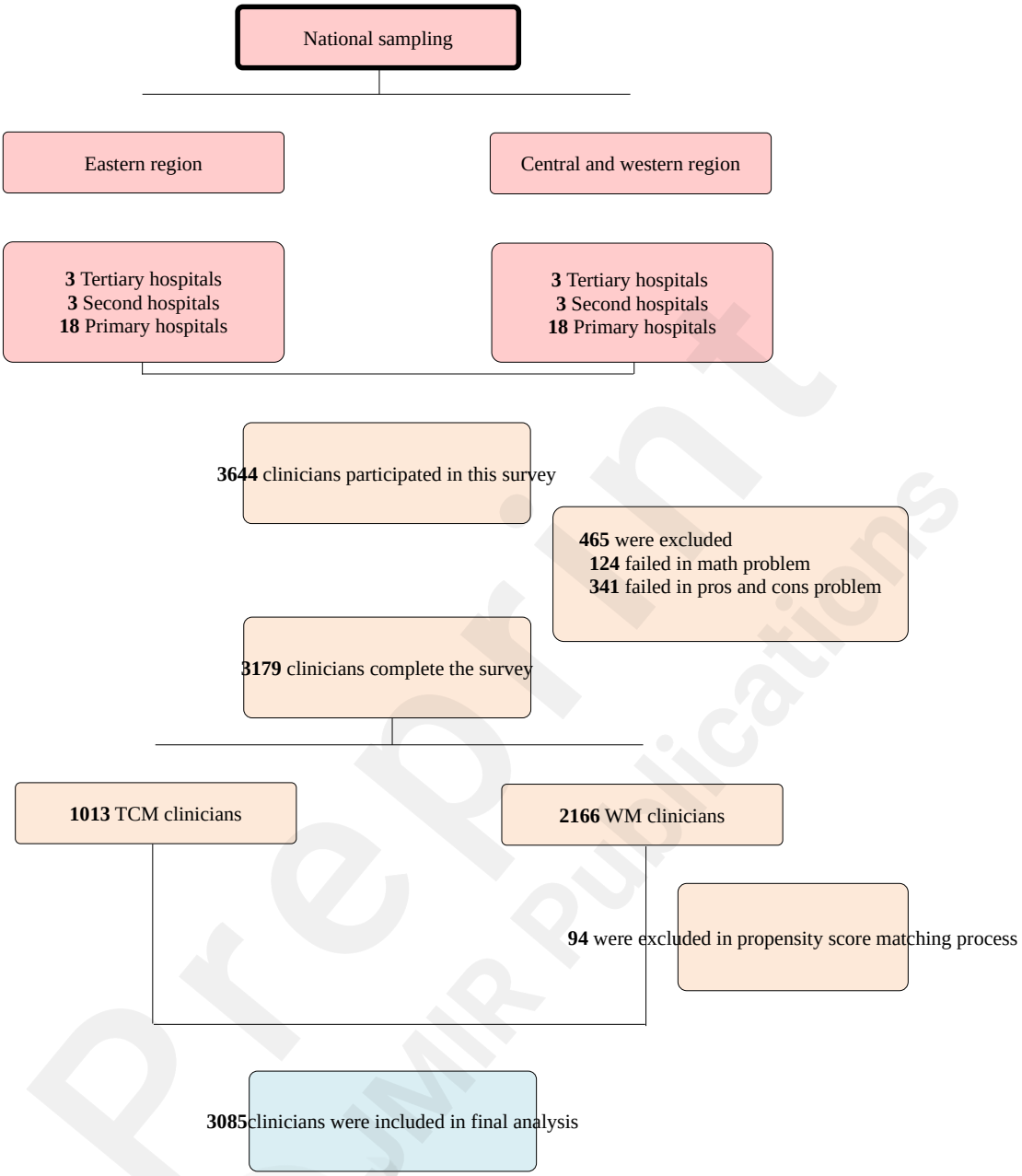

Fig 1 Sample flow.

DCE

A DCE is a technique used widely in the healthcare sector for eliciting people's preferences by prompting them to make specific choices. Here, participants were asked to select a series of preferable vaccination

program. Each program was defined by a set of attributes, including cost of vaccination and risk of adverse events, and the variation in each attribute is referred to as a level. By making a series of choices between a vaccination program with one set of attribute levels and the other with alternative attribute levels, participants implicitly reveal the degree to which each attribute is more important to them and the value they place on each level of the attribute.

This DCE was designed according to health-based principles, ranging from technicalities such as design efficiency to participant-centered considerations such as checking experimental tasks were as clear as possible to participants[13]. Individuals made 8 choices between two alternative influenza vaccination programs. The alternatives were described by attributes and levels representing different characteristics of vaccination programs.

Attributes and levels

Five attributes described the characteristics of vaccination programs in the choice tasks, summarized in Table 1. We selected attributes and levels including: variable cost of vaccine (0 Chinese Yuan (CNY); 50 CNY (approximately $7 USD) or 100 CNY (approximately $14 USD)), variable vaccine effectiveness against infection (20%, 50% or 80%), variable risk of mild adverse events such as redness, swelling, and/or pain at the injection site (1%, 3% or 5%), different vaccination campaign strategies (individual appointment or vaccination in a workplace setting), and different workplace attitudes (no-notice, or encouraging of vaccination).

We selected attributes and levels related to influenza vaccination based on several sources of evidence: a rapid review of existing researches[14-17], one-on-one interview with four TCM clinicians and four WM clinicians, and consultation with subject matter experts. An orthogonal experimental design was used to reduce these choice tasks down to eight choice tasks with 16 hypothetical vaccination programs. Levels were randomly assigned with equal probabilities and repeatedly recombined, with all combinations being plausible and realistic. Priors were obtained from a pilot study of 30 clinicians. Each clinician answered 8 choice tasks, reporting no understanding problem and respondent fatigue. The full choice tasks, as presented to respondents, are shown in Supplementary table 1. The sample size was sufficient to ensure statistical power based on the

pilot parameter estimates[18] (Supplementary sample size calculation).

Table1 Attributes and levels of DCE

Attribute	Levels
1. Cost of vaccine	0 Chinese Yuan 50 CNY (approximately $7 USD) 100 CNY (approximately $15 USD)
2. Vaccine effectiveness against infection	Prevent 20% infection Prevent 50% infection Prevent 80% infection
3. Risk of mild adverse events (such as redness, swelling, and/or pain at the injection site)	1% 3% 5%
4. Vaccination campaign strategies	individual appointment vaccination in a workplace setting
5. Workplace attitudes	No-notice Encouraging of vaccination

Statistical analyses

Sex, age groups, and hospital levels were identified as confounders in propensity score matching, and the propensity score of the WM sample and TCM sample was calculated. We then used a nearest-neighbor matching algorithm to match three WM clinicians with one TCM clinician based on propensity score. Descriptive statistics were used to summarize characteristics of TCM and WM clinicians. For categorical variables, frequencies were reported, and Pearson's chi-squared tests used to test for differences between the two groups. For continuous variables, mean and standard deviation were reported after Shapiro-Wilk tests indicated that the continuous variables were normally distributed. We used t-tests to compare differences across two groups.

To estimate the relative impact of influenza vaccine attributes in the DCE, we conducted mixed logit regression model (MLM) to compute preference weight with 95% CIs. MLM is based on the assumption that random error has a normal distribution, to take heterogeneity as well as correlation between the choice task completed by each participant into account. We validated the linear continuous effects of chosen attributes, and the variables of cost, vaccine efficacy, and risk of mild adverse events were considered as continuous while the vaccination campaign strategies and workplace attitudes were considered as categorized in the

analysis. MLM allowed for the calculation of willingness to pay (WTP), and compensated effects across each attribute. We calculated the expected vaccine coverage for the base case and the change of coverage when the level of one attribute was changed.

Subsequently, we conducted a latent class analysis to classify individuals based on their preference characteristics; an individual is assigned to the class with the highest posterior probability. Our choice in the number of classes was based on model fit and interpretability of results. We compared classes across demographic characteristics across the estimated classes using Chi-square tests. The preference classes were named based on the most preferred attribute levels in each class.

All analyses were based on two-sided p values, with $p<0.05$ indicating statistical significance. Stata (Version 16.0, 2019, Stata Corp LLC, TX, United States) was used for analysis.

Results

Demographics

A total of 3,644 clinicians from six tertiary hospitals, six secondary hospitals, and 36 primary hospitals were invited to participate in this survey. Among them, 599 (16.4%) were ultimately excluded for failing in basic math test (124 clinicians, 3.4%), failing in the pros and cons test (341 clinicians, 9.4%), or in the post-hoc during propensity score matching (94 clinicians, 2.6%). 3085 subjects including 1013 TCM clinicians (32.8%) and 2072 WM clinicians (67.2%)) were finally included in the analysis (Fig 1).

The sample matching adjustment achieved the expected distributions of gender, age groups, and hospital level (Supplemental Fig 2-4). Educational attainment showcases a significant discrepancy, with a notable proportion of TCM clinicians holding a bachelor’s degree (40.4%) compared to WM clinicians (53.4%). Conversely, a higher percentage of WM clinicians have attained a master’s degree (13.9%), or a Doctorate (4.5%) compared to their TCM counterparts. In terms of annual personal income, a higher percentage of TCM clinicians reported incomes of 100,000-200,000 CNY (34.1%) compared to WM clinicians (27.5%). Conversely, a higher proportion of WM clinicians report incomes above 200,000 CNY (19.9%) compared to

TCM clinicians (13.2%). More TCM clinicians (28.3%) have practiced for ≤ 3 years compared to WM clinicians (26.2%). WM clinicians have practiced for longer durations, especially in the 4-9 years and 10-19 years brackets. 50.4% of TCM clinicians holding the title of Residents compared to WM clinicians (44.2%). Conversely, a higher proportion of WM clinicians hold the title of Fellows (39.9%) compared to TCM clinicians (34.2%) (Table 2).

Table 2. Demographics of clinicians practicing in traditional Chinese medicine and western medicine

	Clinicians practicing Traditional Chinese Medicine (n=1013, %)	**Clinicians practicing Modern Western Medicine (n=2072, %)**	***p* value**
Sex			0·31
Male	420(41·5)	899(43·4)	
Female	593(58·5)	1173(56·6)	
Age group (year)			0·63
0-	319(31·5)	618(29·8)	
30-	431(42·5)	893(43·1)	
40-	183(18·1)	407(19·6)	
50-	80 (7·9)	154(7·5)	
Hospital level			0·55
Primary	295(29·1)	637(30·7)	
Secondary	240(23·7)	498(24·0)	
Tertiary	478(47·2)	937(45·2)	
Educational level			<0·001
Junior college or less	220(21·7)	584(28·2)	
Bachelor	409(40·4)	1106(53·4)	
Master	274(27·0)	289(13·9)	
Doctorate	110(10·9)	93(4·5)	
Annual personal income (CNY)			<0·001
0-	535(52·8)	1089(52·6)	
100,000-	345(34·1)	570(27·5)	
200,000-	133(13·2)	413(19·9)	
Length of time practicing medicine (year)			0·44
0-	287(28·3)	543(26·2)	
4–	331(32·7)	677(32·7)	
10–	242(23·9)	540(26·1)	
20–	106(10·5)	232(11·2)	
30-	47(4·6)	80(3·9)	
Professional title			0·003
Residents	511(50·4)	916(44·2)	
Fellows	346(34·2)	827(39·9)	
Attendings	156(15·4)	329(15·9)	

Preference and compensatory effects (including Willing to Pay)

All attributes and levels included are significantly associated with clinicians' preference for choosing influenza vaccination. Both TCM and WM clinicians' preference for influenza vaccination increased with higher vaccine effectiveness, with the vaccination campaign strategies changing from "individual

appointment” to “vaccination in a workplace setting”, or the workplace attitude changing from “no-notice” to “encouraging of vaccination”. Nevertheless, the increase in the risk of mild adverse events and cost would undermine the utility of vaccination towards these two groups. The WTP of TCM clinicians were calculated and showed that each 1% increase in risk of mild adverse events could be compensated by 6.97 CNY decrease of cost. Similarly, changing the mode of administration from “individual appointment” to “vaccination in a workplace setting” could compensate for the negative effect of 78.84 CNY increase of cost. Compensatory effects can be calculated between any attributes, for example, a hypothetical 5% increase in risk of mild adverse events could be compensated by a simultaneous hypothetical 13.7% increase in vaccine effectiveness. WTP and compensatory effect of WM clinicians were calculated in the same way. The relative weights (preference weight coefficients) and WTP of the selected attributes and levels of influenza vaccination program of two groups are shown in Supplementary table 2.

Comparison of Preferences weight

Significant differences were noted for coefficient of mild adverse events risk and effectiveness between clinicians practicing in TCM and WM. TCM clinicians (OR: 0.14, 95%CI: 0.10-0.17) expressed stronger preference for per 1% decrease of mild adverse events risk than WM clinicians (OR: 0.07, 95%CI: 0.04-0.09; p<0.001). Similarly, TCM clinicians (OR: 0.50, 95%CI: 0.47-0.53) expressed stronger preference for per 10% increase of vaccine effectiveness than WM clinicians (OR: 0.43, 95%CI: 0.41-0.45; p<0.001). Other attributes (cost, vaccine vaccination campaign strategies, workplace attitudes) did not present significant differences between two groups (Fig 2).

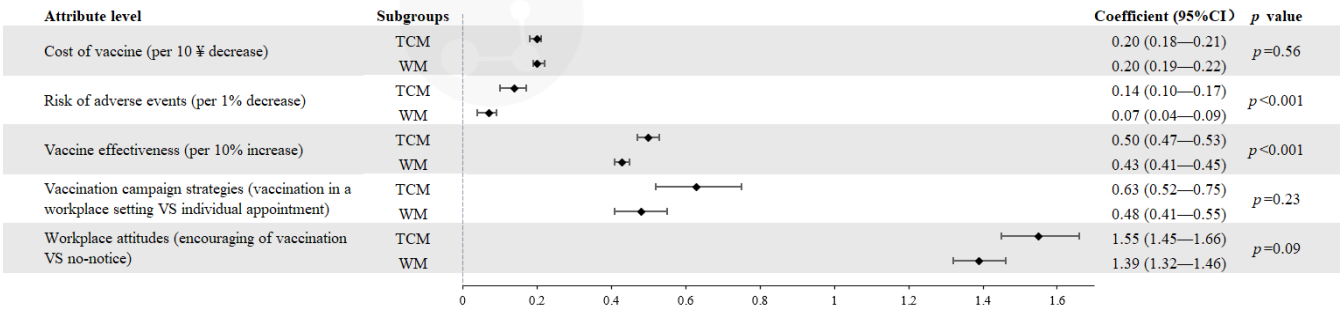

Fig 2 Comparison of Preferences in clinicians practicing traditional Chinese medicine and western medicine.

Expected influenza vaccine coverage

The lowest expected coverage of TCM clinicians was 4.75% and 6.99% in TCM and WM clinicians respectively. Expected coverage increased by approximately 30% with a reduction in mild adverse event risk from 5% to 1%; greater coverage increases could be achieved by either enhancing effectiveness from 20% to 80% or reducing costs from 100 to 0 CNY. An approximate hypothetical 60% increase could be obtained when the attitude of the workplace changed from “no-notice” to “encouraging of vaccination”; there was an approximate hypothetical 35% increase when vaccination campaign strategies changed from “individual appointment” to “vaccination in a workplace setting”. The changing of expected coverage due to improvements in the influenza vaccination program is depicted in Fig 3 (additional details available in Supplementary Table 3).

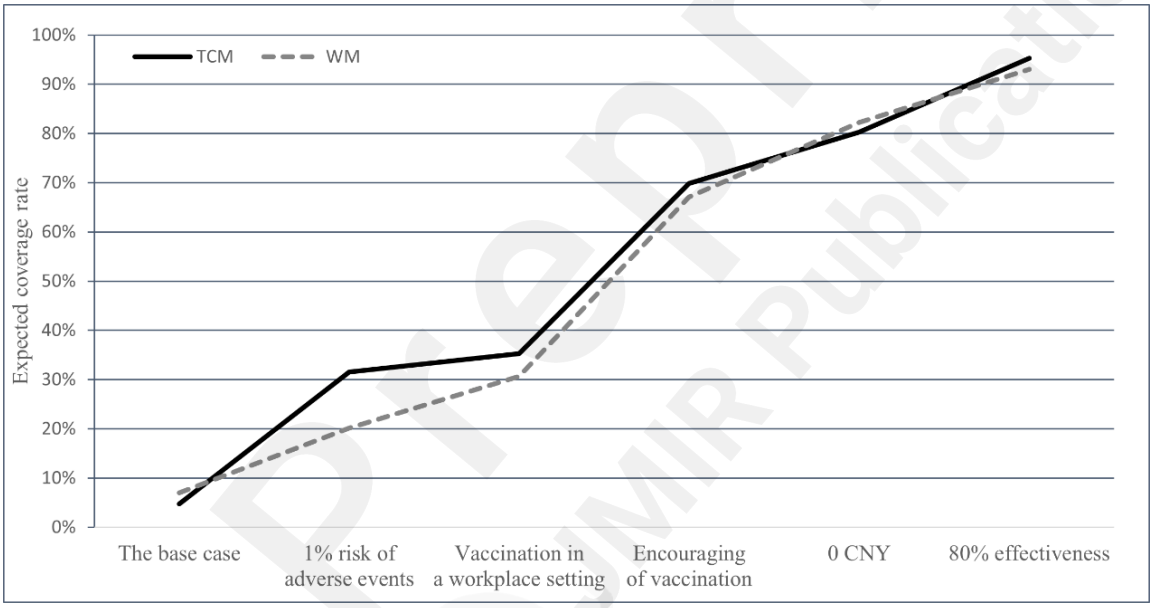

Fig 3. Changes in expected coverage rate, as conditions in influenza vaccination program improve.

Demographic characteristics of latent class

Table 3 details the demographic composition variations across various classes, while the categorization of these classes is recorded in Supplementary Table 4. In the entire sample, about 30% of clinicians prefer free vaccination, while 26% comprehensively consider attributes except for vaccination campaign strategies. Notable trends were observed within two specific classes: clinicians preferring free vaccination and those preferring vaccination in a workplace setting. Among clinicians with different medical licenses, Traditional

Chinese Medicine (TCM) practitioners exhibit a lower preference for free vaccination (29.8% compared to 31.1% among Western Medicine (WM) clinicians) and a higher preference for workplace vaccinations (18.4% compared to 17.0% among WM clinicians, p=0.032). Female clinicians also show differences, with a lower preference for free vaccination (30.2% compared to 31.3% among male clinicians) and a higher preference for workplace vaccinations (18.0% compared to 16.6% among male clinicians, p=0.036). Educational level reveals a U-shaped relationship, where the highest preference for free vaccination is among those with junior college degrees or lower (33.6%), but this preference decreases significantly among those with postgraduate degrees (28.0%, p<0.001). Conversely, there is an inverted U-shaped relationship between educational level and preference for vaccination in a workplace setting. A strong monotonic relationship exists between hospital level and clinicians' preference for free vaccination, with 32.5% of primary hospital workers preferring free vaccination compared to 29.4% of those in tertiary hospitals (p<0.001). On the other hand, clinicians in tertiary hospitals (8.5%) significantly prefer vaccination in a workplace setting compared to those in primary (4.7%) or secondary hospitals (4.2%, p<0.001). No significant differences were found based on age group, annual personal income, length of time practicing medicine, or professional title.

Demographics and *p* values	Categories	Prefer encouraging of vaccination form workplace (%)	Prefer free vaccination (%)	Prefer higher vaccine effectiveness (%)	Considering attributes vaccination strategies (%
Medical practicing license P=0.032*	TCM	14.2	29.8	11.2	26
	WM	14.5	31.1	10.8	26
Age group (year) P=0.544	0-	14.6	31.2	11.0	25
	30-	14.2	30.8	10.9	27
	40-	14.7	29.3	10.9	26
	50-	14.5	31.2	10.5	27
Sex P=0.036*	Male	14.6	31.3	10.8	26
	Female	14.3	30.2	11.0	26
Educational level P<0.001*	Junior college or less	14.7	33.6	10.6	26
	Bachelor	14.4	30.3	11.0	26
	Postgraduate	14.2	28.0	11.3	26
	Doctorate	14.0	29.3	10.8	26
Annual personal income (CNY) P=0.626	0-	14.5	31.1	10.8	26
	100,000-	14.3	30.4	10.9	26
	200,000-	14.2	29.9	11.1	26
Length of time practicing medicine, in years P=0.789	0-	14.5	31.6	11.0	26
	4–	14.6	30.3	10.7	26
	10–	14.2	30.2	11.1	26
	20–	14.4	30.5	11.1	27
	30-	14.3	30.7	10.4	26
Professional (Job) title P=0.277	Residents	14.5	31.4	10.8	26
	Fellows	14.2	30.2	11.0	26
	Attending	14.6	29.7	11.1	26
Hospital level P<0.001*	Primary	14.3	32.5	10.7	26
	Secondary	14.5	30.7	10.9	26
	Tertiary	14.4	29.4	11.1	26

Table 3. Demographic characteristics by influenza vaccination preference from a latent class analysis

Discussion

This study presents an analysis of preferences concerning the attributes of influenza vaccine programs, aimed at elucidating the factors influencing influenza vaccination program participation among a nationally representative sample of clinicians. According to the DCE findings, all examined attributes exhibited a significant impact on the theoretical vaccine preferences for both TCM and WM clinicians.

The findings indicating a higher probability of getting vaccination with increased vaccine effectiveness and decreased likelihood of vaccine-related adverse events align with prior research conducted through questionnaire surveys[19]. The most pronounced preferences were observed regarding workplace attitudes, where active encouragement of vaccination was notably preferred over scenarios with no explicit encouragement. In the United States, the influenza vaccination coverage among HCWs was relatively high (75.1%) when workplaces actively encouraged vaccination. Conversely, the coverage was lowest at 47.6% in settings where no vaccination-related requirements or provisions were in place[20]. The significance of adverse event risks and vaccine effectiveness was notably higher among TCM clinicians compared to WM clinicians. Given the challenges directly altering vaccine effectiveness and the risk of adverse events in the short term, our focus shifted towards evaluating the impact of alternative behavioral and economic interventions. A systematic review indicated that provision of free vaccination, easy access to vaccination, and modification through educational activities and/or reminders can effectively increase the influenza vaccine uptake[21]. In the simulation scenario, decreasing the price of influenza vaccination from 100 CNY to free resulted in a significant increase in projected coverage. Offering free vaccination to clinicians can provide additional benefits such as mitigating absenteeism during the influenza season and preventing hospital-acquired influenza infections. Other workplace-based interventions, such as providing vaccination opportunities at the workplace and promoting vaccination initiatives more broadly, also demonstrated a favorable effect on the projected uptake of influenza vaccine. Given the feasibility and efficacy of these measures, we propose that healthcare facilities should: (1) provide complimentary annual influenza vaccinations; (2) furnish accessible vaccination services for employees; and (3) issue notifications encouraging clinicians to avail themselves of vaccination opportunities.

In our latent class analysis, the majority of clinicians prioritize free vaccination, followed by a substantial group that takes into account all attributes except vaccination campaign strategies when deciding whether to accept an influenza vaccination program. There was evidence suggesting that a higher proportion of TCM clinicians favored workplace-based vaccination, whereas a greater number of WM clinicians preferred free vaccination. This finding can lend support to the creation of a vaccination policy that is more flexible and adaptable. Sex, educational level, and hospital level were all associated with latent classification. Among these considerations, the most significant distinction emerged between clinicians who prefer free vaccination and those who prefer vaccination in a workplace setting. This differentiation suggests that the other three categories (favoring workplace encouragement of vaccination, prioritizing higher vaccine effectiveness, and considering attributes except vaccination campaign strategies) were evenly distributed across all demographics in our study. As a result, measures like releasing notices in healthcare workplaces to encourage clinicians to get vaccinated may achieve similar effects across all groups of Chinese clinicians. Previous study shows that women's inflation (consumer prices increasing) perceptions were higher than men's, but female clinicians presented less preference of free vaccination, and were more preferred vaccination in a workplace setting, compared to WM clinicians in our study[22]. A policy offering free vaccination may hold greater appeal for clinicians with lower levels of education (bachelor's degree or below) or those employed in primary healthcare institutions. Conversely, providing vaccination in a workplace setting was found to be more favorable among clinicians with higher levels of education (postgraduate or doctorate) or those working in tertiary hospitals. In China, clinicians employed in tertiary hospitals serve as the cornerstone of the nation's healthcare provision, handling extensive medical responsibilities that may make it challenging for them to get vaccinated during their private leisure time. Consequently, providing convenient vaccination services for clinicians should be prioritized as a primary measure for these tertiary hospitals.

Strengths of this study include an experimental design underpinned by a scoping review of existing policy and literature related influenza vaccination, as well as the input from a diverse group of people with experience in influenza vaccination programs, clinicians, and other experts majored in vaccinology. This methodology ensured that the study examined program features representative of influenza vaccination and presented them in a manner comprehensible to participants. We employed a large, nationally representative

sample. Oversampling clinicians practicing TCM meant we were able to assess whether preferences for influenza vaccination differed from those counterparts practicing WM in this group. We implemented measures to ensure data quality, including conducting post-hoc propensity score matching to validate our findings. Furthermore, advanced modeling techniques were utilized to generate robust estimates.

Our study is subject to several limitations. Firstly, the use of an online survey could impact the representativeness of the national sample, as our sample of clinicians did not perfectly mirror the socio-demographic characteristics of the entire nation. Additionally, there may be biases between individuals who completed the survey and those who did not. However, all estimates were weighted to address oversampling in the study. Secondly, as a cross-sectional study, potential recall bias is inevitable. Moreover, Discrete Choice Experiments (DCEs) are susceptible to hypothetical bias, meaning that responses in surveys may not perfectly align with real-life behaviors[23]. This discrepancy could limit the accuracy of measured preferences. To mitigate this, we designed the experiment based on real-world influenza vaccination programs and ensured that the details and definitions of each attribute were comprehensible and reliable for participants. Our findings have important public health implications. Using DCE to examine the relative importance of attributes related to vaccine characteristics, healthcare workplace attitude influence and convenience in access to influenza vaccine for determining clinicians' preference for influenza vaccination. The final aim was to identify the optimal influenza vaccination program for promoting vaccine uptake among clinicians. With an increasing number of TCM outpatient visits and hospitalizations over the past ten years[11], TCM clinicians that holding different principle in clinic treatment from their counterparts, has been playing an important role in Chinese health system. This study shed light on the differences of vaccination preference, to seek and proof effective measures for both two groups.

Conclusions

In conclusion, our study delineated clinicians' preferences regarding attributes of influenza vaccination programs. There is a potential for increased uptake of influenza vaccination programs by aligning program features with these preferences. Policymakers can utilize these insights to formulate flexible intervention measures that facilitate greater accessibility of influenza vaccination programs for clinicians.

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Availability of data and material

Deidentified cross-sectional data and the discrete choice models from the analysis can be made available by the corresponding author after the authors' review of requests.

Author's Contributions

LZ, and CF conceptualized the study, contributed to the overall design of the survey experiment, analysis, and interpretation of the data, and is the guarantor for the study. LZ cleaned the data, performed the analyses, draw the figures, conducted literature searches, and wrote the first draft of the manuscript. LZ, LC, YZ, XS, ZW, MS, and CF discussed the results and interpretation of the data.MS and CF reviewed and approved the manuscript.

Conflicts of Interest

None declared.

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Abbreviations

CI: confidence interval

CNY: Chinese Yuan

DCE: discrete choice experiment

MLM: mixed logit regression model

OR: odds ratio

TCM: traditional Chinese medicine

WHO: World Health Organization

WM: western medicine

WTP: willing to pay

Supplementary Files