

Exploring the Primary Models and Their Efficacy of Health Education in Universities in the Zhanjiang Area During the Post-COVID-19 Era

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Abstract

Objective To explore the main models and effects of health education in under-graduate colleges in the post COVID-19 era in Zhanjiang. **Method:** Randomly select 2000 second year students from two universities in Zhanjiang area to conduct a questionnaire survey on the health education mode; Randomly select 600 students and divide them into three groups. Each group will receive training on a health education model. **Results** The number of people who chose "WeChat official account push" was the largest, the number of people who chose "set up stalls to distribute publicity materials" ranked second, and the number of people who chose "popular science lectures on infectious disease prevention and control" ranked third. There was no statistically significant difference ($P > 0.05$) in the number of syphilis awareness cases between male and female groups in colleges and universities. There was no statistically significant difference ($P > 0.05$) in the awareness of the three groups of research subjects before the training; There were statistically significant differences ($P < 0.05$) in the knowledge levels of the three research teams before and after training. After the training, there was a statistically significant difference ($P < 0.05$) in the knowledge among the three groups, indicating that the effects of the three educational models were not consistent; There was a statistically significant difference between the "WeChat official account push" group and the other two groups ($P = 0.001$, $P = 0.018$); The difference between the other two groups was not statistically significant ($P = 0.372$). **Conclusion** In the post epidemic era in Zhanjiang, the most popular health education models include WeChat official account push, setting up stalls to distribute publicity materials and popular science lectures on infectious disease prevention and control; The WeChat official account push mode has the best effect and is worth promoting vigorously; The other two modes also have advantages and can be carried out synergistically.

Keywords

Zhanjiang Area; the Post-COVID-19 Era; Higher education institutions; Health education

1. Introduction

As reported, the "COVID-19 pandemic" [1] (abbreviated as "the pandemic") emerged in December 2019 and subsequently evolved into a global outbreak, causing widespread devastation. Characterized by rapid transmission, frequent mutation, and high virulence, the SARS-CoV-2 virus has posed a serious threat to global public health and socioeconomic stability, generating significant (panic). Universities, characterized by high population density and concentrated living environments, attract considerable societal attention. Any outbreak of infectious disease within these settings can trigger public health emergencies with severe consequences [2]. In the post-COVID-19 era (hereinafter referred to as the "post-pandemic era"), it is imperative to prioritize infectious disease health education and adapt its methodologies accordingly. Using COVID-19 prevention and control as a paradigm, there is a need to actively develop and implement comprehensive health education training tailored to this new context. Adopting a student-centered approach, identifying the most preferred health education modalities for infectious diseases, enhancing their contemporary relevance and appeal, and delivering precise and efficient knowledge on infection prevention are crucial strategies. These efforts aim to raise students' prevention awareness, improve their knowledge levels, fortify the first line of defense for health, and effectively safeguard their physical well-being and safety [3]. This study randomly selected sophomore students from two undergraduate institutions in the Zhanjiang area. Using syphilis prevention education as a model, the three most preferred health education modalities among students were applied to train the participants. Awareness levels were assessed, and the efficacy of these three health education models was analyzed. The detailed research is reported as follows.

2. Materials and Methods

2.1. General Information

Sophomore students from two undergraduate universities in the Zhanjiang area were selected as the survey population. An anonymous online survey titled "Questionnaire on Health Education Models in the Post-Pandemic Era" was administered via the Questionnaire Star platform, yielding 2000 valid responses (University A: 1014; University B: 986). Following informed consent, 600 sophomores were randomly selected as study participants and equally divided into three groups of 200 students each. Inclusion criteria comprised: sophomore students who voluntarily agreed to participate in the survey, demonstrated the ability to complete questionnaires truthfully and conscientiously, and committed to full participation in the entire health education program. Exclusion criteria included: a history of sexually transmitted infections (e.g., syphilis), prior participation in similar health education research, refusal to complete the questionnaire, or inability to participate fully in

the health education activities. The final cohort included 300 participants from each university; 294 males and 306 females, with a mean age of 19 ± 0.5 years.

2.2. Methods

The survey was conducted using a hybrid online and offline approach. The "Questionnaire on Health Education Models in the Post-Pandemic Era" contained 8 options as multiple-choice items (with respondents limited to selecting exactly 3), administered via the Questionnaire Star platform. The "Syphilis Prevention Knowledge Awareness Questionnaire" comprised 8 questions, with correct responses to at least 6 items defining adequate awareness; this questionnaire was administered offline. Both instruments collected data on the respondent's institution, gender, age, and academic year. All survey procedures and protocols were standardized to ensure data quality.

2.3. Observation Indicators

The number of participants selecting each health education modality; The awareness rate of syphilis among the study participants before and after the health education intervention.

2.4. Statistical Analysis

Data analysis was performed using SPSS 22.0. Continuous data were expressed as mean $\pm$ standard deviation ($\bar{x} \pm s$) and compared using the t-test. Categorical data were presented as rates (%) and analyzed by the chi-square (χ^2) test. A two-sided P-value of < 0.05 was considered statistically significant for all tests.

3. Results

3.1. Distribution of Participant Preferences for Health Education Modalities in the Post-Pandemic Era

Survey participants exhibited varying preferences for health education modalities. The most favored modality was "WeChat public account pushes," selected by 1,848 individuals, accounting for 92.40% of respondents. This was followed by "distribution of promotional materials at booth stations," chosen by 1,610 participants (80.50%), and "science popularization lectures on infectious disease prevention and control," selected by 1,590 individuals (79.50%), ranking third. Detailed data are presented in Table 1.

Table 1. Statistics on the Demand for Health Education Modalities in the Post-Pandemic Era (n=2000)

Preferred Modality	n	%
Television access; Radio access	628	31.40
Science Popularization	1590	79.50
WeChat public account messaging	1848	92.40
Thematic Class Session	1024	51.20
Distribution of promotional materials at designated booth stations	1610	80.50
Distribution of promotional materials at designated booth stations	860	43.00
On-campus clinic-based health education	820	41.00
Others	260	13.00

3.2. Syphilis Prevention Knowledge Awareness by Institution and Gender

The number and rate of syphilis awareness among participants from the two institutions were 187 (62.33%) and 191 (63.66%), respectively. Comparison between the two institutions showed no statistically significant difference ($P > 0.05$), indicating comparable levels of syphilis knowledge. Similarly, the awareness rates among male and female students were 190 (64.19%) and 192 (63.16%), respectively, with no statistically significant difference observed ($P > 0.05$), suggesting equivalent knowledge levels between genders. Detailed data are presented in Table 2.

Table 2. Syphilis prevention knowledge awareness stratified by institution and gender [n (%)]

Demographic Characteristic		Total Number (Percentage)	Awareness Rate (%)	χ^2	P
Institution	A University	300 (50)	187 (62.33)	0.114	0.735
	B University	300 (50)	191 (63.66)		
Gender	Male	296 (49.33)	190 (64.19)	0.069	0.793
	Female	304 (51)	192 (63.16)		

3.3. Syphilis Awareness Under Three Primary Health Education Modalities Prior to Intervention

A comparison of syphilis prevention knowledge awareness among the three participant groups before the training intervention showed no statistically significant difference ($P > 0.05$). This indicates equivalent baseline awareness levels across all groups prior to the implementation of the health education programs. Detailed results are presented in Table 3.

Table 3. Pre-intervention Awareness Among Study Participants [n (%)]

Group	n	Awareness n (%)	χ^2	P
WeChat Public Account Push	200	125 (62.50)	0.300	0.861
Lectures on Infectious Disease Prevention and Control	200	129 (64.50)		
Distribution of promotional materials at designated booth stations	200	124 (62)		

3.4. Syphilis Awareness Before and After Implementation of the Three Primary Health Education Modalities

At the conclusion of the study period, a unified survey on syphilis prevention knowledge awareness was conducted. The awareness rates were 190 (95.00%) in the "WeChat Public Account Push" group, 171 (85.50%) in the "Science Popularization Lectures on Infectious Disease Prevention and Control" group, and 177 (88.50%) in the "Distribution of Promotional Materials at Booth Stations" group. Intra-group comparisons of awareness levels before and after the health education intervention revealed statistically significant improvements in all three groups ($P < 0.05$), demonstrating the effectiveness of each primary health education modality. Detailed data are presented in Table 4.

Table 4. Intra-Group Awareness Before and After Health Education Intervention [n (%)]

Group	n	Pre-Intervention	Post-Intervention	χ^2	P
<i>WeChat Public Account Push</i>	200	125 (62.50)	190 (96.50)	63.119	0.000
<i>Lectures on Infectious Disease Prevention and Control</i>	200	129 (64.50)	171 (85.50)	23.520	0.000
<i>Distribution of promotional materials at designated booth stations</i>	200	124 (62)	177 (88.50)	37.706	0.000

3.5. Comparison of Awareness Levels Following Implementation of the Three Primary Health Education Modalities

Following the training intervention, awareness data from the three groups were collected via questionnaire. Statistical analysis revealed a statistically significant difference in overall awareness among the three groups ($P < 0.05$), suggesting differential efficacy of the health education modalities. Pairwise comparisons demonstrated that the "WeChat Public Account Push" group showed statistically significant differences compared to each of the other two groups (vs. Science Popularization Lectures: $\chi^2 = 10.256$, $P = 0.001$; vs. Distribution of Promotional Materials at Booth Stations: $\chi^2 = 5.582$, $P = 0.018$), confirming the superior educational efficacy of the "WeChat Public Account Push" modality. In contrast, no statistically significant difference was observed between the "Science Popularization Lectures on Infectious Disease Prevention and Control" group and the "Distribution of Promotional Materials at Booth Stations" group ($\chi^2 = 0.796$, $P = 0.372$), indicating comparable educational effectiveness between these two modalities. Detailed results are presented in Table 5.

Table 5. Post-Intervention Awareness Under the Three Primary Health Education Modalities [n (%)]

Group	n	Post-Intervention	χ^2	P
<i>WeChat Public Account Push</i>	200	190 (96.50)		
<i>Lectures on Infectious Disease Prevention and Control</i>	200	171 (85.50)	10.181	0.006
<i>Distribution of promotional materials at designated booth stations</i>	200	177 (88.50)		

4. Discussion

Infectious diseases constitute a significant public health challenge with profound implications for human health, lifespan, and socioeconomic development [4]. The

prevention of these diseases is, therefore, a concern demanding universal attention. China boasts a massive population of university students, the majority of whom have not received systematic education in infectious disease knowledge, leading to insufficient awareness. Effectively enhancing the awareness level of this demographic is a priority for health education efforts within higher education institutions. This study selected a sexually transmitted disease (syphilis) as the target condition for training evaluation. The survey revealed a syphilis core knowledge awareness rate of merely 63% among the participants, which falls considerably short of the targets outlined in the *National Plan for Syphilis Prevention and Control in China (2010-2020)* [5, 6]. Despite ongoing prevention education campaigns conducted by medical institutions, disease control departments, and educational agencies at all levels, which have indeed contributed to raised awareness among university students [7], the current awareness rate remains suboptimal. Consequently, there is a substantial journey ahead in improving the awareness of syphilis prevention knowledge [8], underscoring the critical need to explore efficient and precise health education models for syphilis.

This investigation revealed that the most preferred health education modality among students in the post-pandemic era was "WeChat Public Account Push," selected by 92.40% of respondents, a finding largely consistent with reports by domestic scholars such as Chen Liying [9, 10]. Four primary reasons may explain this preference: First, influenced by the COVID-19 pandemic, students exhibit a reluctance for interpersonal communication and a subconscious avoidance of crowded places. Second, the widespread adoption of electronic devices, primarily smartphones, has accelerated students' immersion in digital environments. Third, contemporary society operates within a highly developed digital network, facilitating the rapid dissemination of novel information and trends online. Fourth, the distinct advantages of WeChat public accounts—enabling convenient, immediate access to relevant information and allowing individuals to engage in self-directed health education anytime, anywhere—are highly valued by young students. Despite the impact of the pandemic, the two more traditional modalities—"Distribution of Promotional Materials at Booth Stations" and "Science Popularization Lectures on Infectious Disease Prevention and Control"—were also recognized by approximately 80% of students, aligning with findings reported by other domestic scholars [11]. Students who preferred the booth distribution method may value the ability to read and retain physical materials, annotate them for note-taking, and revisit them for reinforced learning, thereby avoiding issues like poor internet connectivity that can hinder access to digital content. Conversely, those who chose the science popularization lectures likely appreciate structured training schedules within a defined health education program and value interactive engagement with instructors. Therefore, practical implementation should leverage the strengths of these two modalities to conduct health education initiatives.

The study found that the comparisons of syphilis awareness rates before and after the implementation of each of the three health education modalities were all statistically significant, indicating that all three models are effective. Consequently, they should all be considered for inclusion and application in the practical development of infectious disease health education programs. However, statistical analysis of the awareness levels achieved after the intervention revealed that the "WeChat Public Account Push" modality yielded superior outcomes compared to the other two models. This finding suggests that health educators in universities should strategically focus on identifying and mastering the most impactful health education modalities. It underscores the need for institutional-level coordination to consolidate health education resources, foster multi-departmental collaboration, continuously advance IT-enabled services, and promote dedicated health education WeChat public accounts. These accounts should disseminate visually engaging and easily comprehensible informational materials on infectious disease prevention. Finally, this study has certain limitations. It did not incorporate AI-powered health education modalities [12], nor did it explore pairwise combinations of a broader range of models to investigate whether such combined approaches might yield effects surpassing those of the currently identified top three student-preferred methods. Future research should therefore examine whether such combined modalities produce a synergistic effect where the combined outcome exceeds the sum of their individual effects.

In summary, in the post-pandemic era in Zhanjiang, the three most preferred health education models among students are "official account push notifications," "on-site stall distribution of promotional materials," and "epidemic prevention science lectures." All three models are effective, with "official account push notifications" yielding the best results. It is essential to fully leverage these three models, particularly "official account push notifications," to carry out standardized, efficient, and targeted health education efforts on infectious diseases. This will effectively enhance college students' awareness of disease prevention, improve their knowledge of preventive measures, and comprehensively curb the spread of infectious diseases on university campuses.

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