ORIGINAL ARTICLE

# Social Media Promotion of a Telehealth-based Vaccine Delivery System at the Outpatient Department: a Quasi-Experimental Study

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## ABSTRACT

**Background and Objective.** COVID-19 pandemic gave rise to an increase in demand for pneumococcal and influenza vaccines. Several approaches to improve vaccination rates among different populations were investigated to address this need. Social media may be used as a platform to promote and improve vaccination rates. The study aimed to determine the effect of social media promotion, on the number of patients requesting vaccination in a government tertiary hospital.

**Methods.** The study was conducted using a quasi-experimental design. A telehealth-based vaccination delivery system was established. The need for vaccination against flu and pneumonia was then promoted on a social media platform during the first month of the study. Posters on the risk of not being vaccinated and safety profile of vaccines were added on the second month. The number of requests for vaccination for each month was compared. Social media metrics of the two months of the study were likewise described.

**Results.** A total of 23 requests for vaccination were recorded, 11 on the first month and 12 on the second month. When a boost in advertising for the posts was implemented, twice as many requests were made during the third week of the second month as compared to the previous month (5 vs 10). Social media promotion with poster showed higher average in reach, engagement and comments per week than without poster. The mean differences among the social media metrics, however, were not statistically significant.

**Conclusion.** Promotion with posters resulted in a slight increase in number of vaccination requests. Further increase in requests may require a more refined social media promotional strategy.

*Keywords: influenza vaccine, pneumococcal vaccine, social media promotion, telehealth*



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## INTRODUCTION

Following the spikes of infection during the COVID-19 pandemic, demand for vaccination has increased worldwide. This is evidenced by a peak in worldwide online search for pneumococcal and influenza vaccines just as the COVID-19 pandemic was starting to emerge.[1]

Major challenges in achieving full public vaccine coverage are mistrust and lack of awareness. Following a controversy in public vaccination against the Dengue virus in 2017, trust in vaccines plummeted with 93% of Filipinos strongly agreeing on the importance of vaccination in 2015 to only 32% by 2018.[2] A national survey of Filipinos 60 years and above found that only 29.6% of the respondents were aware of pneumococcal vaccines for older people and only 41.0% were aware of influenza vaccine.[3]

Several approaches have been studied to improve vaccination rates among different populations. A number of strategies were investigated, including the use of electronic health records while another suggested to raise public awareness by doctors and local authorities.[4,5] It has also been found that omission of age groups in immunization programs of the government contributed to low vaccination rates.[6] Insurance of cost-free access to vaccination coupled with education by healthcare professionals on the risks of not being vaccinated and safety of vaccination can improve vaccine utilization.[7] A local study evaluated the effectiveness of paper reminders and a vaccine express lane, and concluded that providing people with relevant accurate information is an important aspect of improving vaccination rates.[8] Studies have found that social media is also a viable and effective platform for the promotion of health and fund of information to affect people's health decision making.[9-11] Through a 3-arm randomized controlled trial, Daley et al. concluded that providing information on vaccination with social media components can improve vaccine attitudes.[12] This intervention led to significant reductions in vaccine-related doubts and concerns compared to standard advice.

Part of the Sustainable Developmental Goals adopted by the United Nations in 2015 under good health and well-being is to achieve universal health coverage which includes access to quality, effective, and affordable vaccines. To increase vaccine coverage, awareness must be promoted and mistrust must be addressed. A social media-based promotion was therefore explored if it can improve vaccination rates. This study investigated the effect of social media promotion on the number of patients who registered to a telehealth-based vaccine delivery system in the outpatient clinics of a tertiary government hospital. The results of this study may springboard further vaccination promotional strategies, particularly targeted to the more vulnerable population and those most in need.

The study aimed to determine the number of people requesting vaccination via Google Forms during the months of social media promotion without and with the addition of a poster on the threats of infection and safety of the vaccines. It also measured the social media metrics of the posts on promoting vaccination. It aimed to determine the proportion of people who followed through with vaccination over the total number of people who requested for vaccination.

## METHODS

The study was conducted in a government tertiary hospital using a quasi-experimental study design. A telehealth-based vaccination delivery system was established, and a social media application was used as a platform to promote the service of the system during a two-month period. A month prior was dedicated for preparations and set-up of the system. Within this period, the number of requests for vaccination was compared pre-intervention and post-intervention. Said intervention was the inclusion of electronic posters on safety and threat of being unvaccinated in the social media-based promotion.

A telehealth-based vaccination delivery system was implemented in this study, using an electronic database, spreadsheets, and Short Message Service (SMS). A physical vaccination site was set-up in the outpatient department and a cold supply chain was coordinated via an already existing mobile application (GlaxoSmithkline's VaxSmart app). Patients registered into the system via the Facebook link to the Google Forms, and their data were stored in an electronic database.

### Social Media Promotion

Prior to the implementation of the study, a Facebook business page of the telehealth-based vaccination delivery system was set up (Figure 1). Doctors in the outpatient

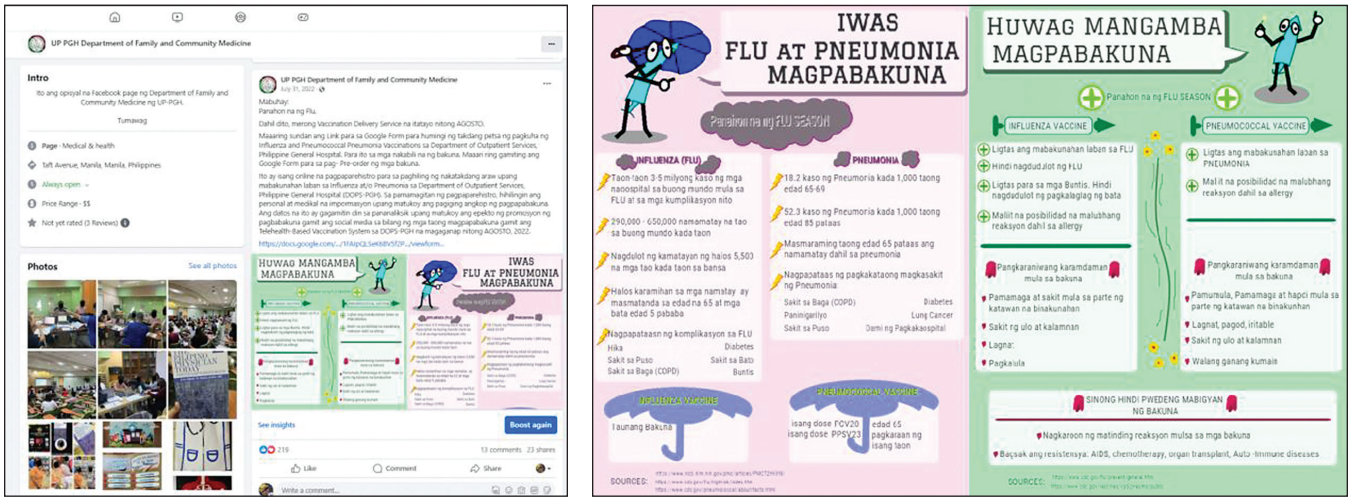


**Figure 1.** Social media-based promotion (in Tagalog) of vaccine delivery service with posters on efficacy and safety.

clinic were encouraged to inform patients requiring vaccines to visit this page. During the first month, a social media post was made explaining the need for vaccination against flu and pneumonia while promoting the available services offered by the telehealth-based vaccine delivery system. Included in this post was the link to the Google Form to register for vaccination. No further posts were made, however, the original post was shared by the page users and administrators. Comments were encouraged. On the third week of promotion, the post was boosted to expand the reach. On the second month of the study, posters were added to the original social media post, showing the possible threats and risks of getting influenza and pneumonia, and the safety of influenza and pneumococcal vaccines. Again on the third week, the post was boosted.

Patients who clicked on the link from the Facebook page were directed to a Google Form in order to register and request for vaccination via the telehealth-based vaccination delivery system. Here, they were asked to give first and last names, date of birth, sex, city of origin, vaccines requested, and if they were going to purchase vaccine/s from the hospital pharmacy. They were also asked for previous doses of influenza/pneumococcal vaccines, history of other vaccinations, allergic reactions to vaccines, if these reactions required hospitalization, and co-morbidities such as cancer, bronchial asthma, chronic obstructive pulmonary disease, cardiovascular disease, and HIV Infection. From here, patients for vaccination were screened based on the 2022 Guidelines of the Advisory Committee on Immunization Processes.[13] Patients for vaccination included adults 19 years of age and above. Patients who had prior severe allergic reactions to a vaccine component or following vaccination and immunocompromised patients were also screened. Patients who did not qualify for vaccination were informed via phone call.

### Inclusion Criteria

All responses on the accomplished google forms, whether or not they were qualified to receive the vaccines, were included in the study. Those with contraindications for vaccinations and not qualified to receive the vaccines were not included in the total number of people who requested for vaccination in the computation of the proportion of people who followed through with vaccination.

### Data Collection

The weekly number of requests for vaccination via the Google Form were recorded from its electronic database. Mean weekly number of vaccination requests were compared between the two months using two-tailed t-test of paired samples. The reach, engagement, number of likes and reactions, number of comments, and shares per week of the promotion were taken from the Facebook page. Mean differences between these social media metrics were also obtained using two-tailed t-test of paired samples. The proportion of people who followed through with their vaccination over the total number of people who requested for vaccination was obtained from the database of the telehealth-based vaccination delivery system.

### Ethical Considerations

This study had undergone review and was approved by the UP Manila Research Ethics Board (UPM-REB). Following data privacy laws, information given by the patients were stored in password-protected electronic databases using Google Form and Google Sheet that were encrypted both in transit and at rest by the platform. Patients were informed of data privacy in the Google Form. Only the lead investigator had full access to the full database. All information stored online were deleted upon completion of the study.

## RESULTS

The posts between the two months of social media promotion achieved similar reach (Table 1). Both had a huge increase at week 3 after the 5-day advertisement boost for each post. The reach on week 4 of the first month was able to achieve higher numbers compared to that of the second month. The subsequent rise in numbers of engagement, number of likes and reactions, comments, and shares were observed to follow the same pattern as that seen in reach. Social media promotion with poster showed higher average in reach, engagement and comments per week than without poster. In terms of average likes, reactions, and shares per week, higher numbers were achieved during the month of promotion without poster than with poster. The mean differences among the social media metrics, however, were not statistically significant.

A total of 23 requests for vaccination were recorded during the two-month period of the study (Figure 2). All those who requested had no contraindications to either flu or pneumococcal vaccines and were qualified to receive such vaccines. On the first month, 11 requests were made

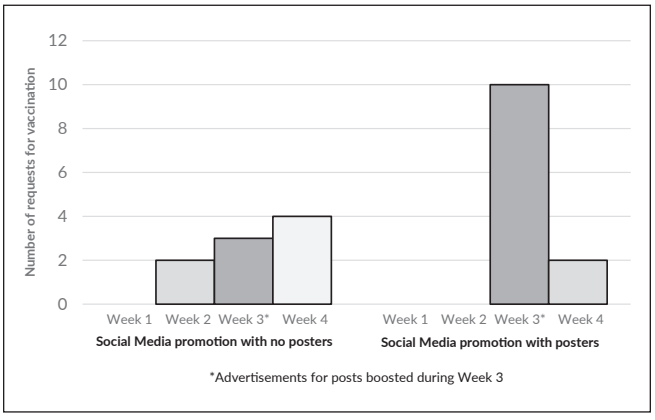


**Figure 2.** Requests for vaccination via telehealth-based vaccination system during social media promotion with and without posters.

**Table 1.** Social Media Metrics on the Promotion of Vaccination via a Telehealth-based Delivery System, per week from July 2022 to August 2022

| Months | Week | Social Media Metrics | | | | |
|---|---|---|---|---|---|---|
| | | Reach | Engagement | Likes and Reactions | Comments | Shares |
| ***Social media promotion with no posters*** | 1 | 119 | 7 | 0 | 0 | 3 |
| | 2 | 35 | 3 | 2 | 0 | 0 |
| | 3* | 7730 | 1269 | 383 | 10 | 19 |
| | 4 | 1618 | 274 | 126 | 2 | 5 |
| | Average | 2375 | 388 | 128 | 3 | 7 |
| ***Social media promotion with posters*** | 1 | 429 | 38 | 8 | 0 | 2 |
| | 2 | 42 | 0 | 0 | 0 | 0 |
| | 3* | 13904 | 3290 | 215 | 14 | 20 |
| | 4 | 125 | 16 | 2 | 0 | 0 |
| | Average | 3625 | 836 | 56 | 4 | 6 |
| | *p*-value | 0.51 | 0.46 | 0.20 | 0.72 | 0.42 |

**Boost on advertisement for posts*

*Definitions: Reach – the number of people who saw any content from or about the post; Engagement – any action someone takes on the posts; Likes and Reactions – communication of enjoyment and specific response to the post; Comments – text response to post; Shares - publication of post to other users' Facebook wall*

during social media promotion without posters. On the second month, 12 requests were made during social media promotion with posters. When a boost in advertising for the posts was implemented, twice as many requests were made during the third week of the second month as compared to the previous month (5 vs 10). Overall, there was a slightly higher average of requests per week during the second month (3.00 ± 2.21 vs 2.75 ± 4.76, requests made per week) when the posters were added. This, however, was not found to be statistically significant (p-value = 0.89).

Both populations of patients requesting for vaccination between the two months of social media promotion have mostly similar demographic characteristics (Table 2). Both have similar male:female ratios (7:4 vs 9:3) and similar ratios of those living within and outside of Metro Manila (8:3 vs 9:3). The mean age of the patients whose requests were received in August 2022 was younger than that of those in July 2022 (32.55 ± 10.74 vs 25.00 ± 21.84). While none of the requests in July 2022 were from patients aged 18 years and below, five requests made in August 2022 were. None of those who requested for vaccines during the trial period had any contraindication to pneumococcal and influenza vaccines such as severe allergic reactions and active comorbidities.

There were a total of three requests for flu vaccine, four for pneumonia vaccine and three for both in July 2022, while there were 2, 0, and 10, respectively in August 2022. Among the flu vaccine requests, there was one request in August 2022, whom had their previous flu vaccination less than a year since date of request. Among the pneumonia vaccine requests, there were three in July 2022 and three in August 2022, who had their previous pneumonia vaccine within the last five years since date of request.

There were three requests in July 2022 and five requests in August 2022 that did not meet criteria to proceed to vaccination. These patients were informed via phone call that only adults aged 19 and above and those due for their scheduled flu and pneumonia vaccines will proceed to on-site vaccination. The rest (15 patients) were scheduled for their on-site vaccination at the outpatient clinic in Family Medicine of the tertiary hospital, nine of whom deferred their requests due to long distance of vaccination site or have already got their vaccines elsewhere (mostly from local health units) and six were lost to follow-up. Therefore, for both groups, the proportion of people who followed through with vaccination over the total number of people who requested for vaccination was zero.

Promotion of vaccination using social media can be effective in reaching a vast amount of people. As the study showed, vaccine promotion using social media had a wide reach and engagement. However, a relatively small number of requests were made and none pushed through with the vaccination due to various reasons. Like advertisements in a business, the promotional strategies need to be eye catching and engaging, while providing accurate information and easy to understand instructions in helping patients understand and request for their vaccination needs.

## DISCUSSION

The study showed similar number of requests for vaccination in social media promotion with posters versus no posters. The highest requests were made in the week of boosting of advertisement of social media posts, with a higher number of requests in the promotion of posters over no posters. Previous studies have shown that a social media-based promotion increased vaccination rates. Positive information on vaccine efficacy and safety are correlated with higher intent to vaccinate.[14] Other strategies included directly

**Table 2.** Demographics of Patients who Requested Vaccination via Telehealth-based Vaccination Delivery System from July to August, 2022

| | July 2022 | August 2022 |
|---|---|---|
| ***Sex*** | | |
| Female | 7 (63.64%) | 9 (75.00%) |
| Male | 4 (36.63%) | 3 (25.00%) |
| ***Mean Age*** | 32.55 ± 10.74 | 25.00 ± 21.84 |
| 18 years of age and below | 0 (0.00%) | 5 (41.67%) |
| 19 years of age and above | 11 (100.0%) | 7 (58.33%) |
| ***Address*** | | |
| Within Metro Manila | 8 (72.73%) | 9 (75.00%) |
| Outside Metro Manila | 3 (27.27%) | 3 (25.00%) |
| ***Contraindications to Vaccination*** | | |
| None | 11 (100.0%) | 12 (100.00%) |
| History of Severe Allergic Reaction | 0 (0.00%) | 0 (0.00%) |
| Allergy to Vaccine/Vaccine Product | 0 (0.00%) | 0 (0.00%) |
| Co-morbidities (i.e., Cancer, HIV, etc.) | 0 (0.00%) | 0 (0.00%) |
| ***Vaccine Requested*** | | |
| Quadrivalent Influenza (Flu) only | 3 (27.27%) | 2 (16.67%) |
| Pneumococcal Polysaccharide Vaccine - PPSV23 (Pneumonia) only | 4 (36.63%) | 0 (0.00%) |
| Both | 4 (36.63%) | 10 (83.33%) |
| ***Previous Flu Vaccinations of Flu Vaccine Requests*** | | |
| Less than a year from date of request | 0 (0.00%) | 1 (8.33%) |
| One and more than a year from date of request | 7 (100.00%) | 11 (91.67%) |
| None | 0 (0.00%) | 0 (0.00%) |
| ***Previous Pneumonia Vaccinations of Pneumonia Vaccine Requests*** | | |
| Less than five years from date of request | 3 (37.50%) | 3 (30.00%) |
| Five or more years from date of request | 0 (0.00%) | 1 (10.00%) |
| None | 5 (62.50%) | 6 (60.00%) |
| ***For vaccination*** | | |
| Will proceed to vaccination | 8 (72.73%) | 7 (58.33%) |
| Did not meet criteria for vaccination | 3 (27.27%) | 5 (41.67%) |

addressing misinformation and vaccine hesitancy through more active discussions on general vaccine information, the need for vaccination, and the promotion of positive attitudes with vaccination.[15-17] A common strategy seen in these studies included the active search for misinformation that led to vaccine hesitancy and addressing these accordingly. Viswanath et al. determined that risk perception and exposure to different media for COVID-19 news affected its vaccine uptake.[18] Public health communication strategies could potentially address these determinants and increase vaccine uptake. Wilson and Wiysonge determined that there is significant relationship between vaccine doubts and social media organization.[19] The prevalence of foreign disinformation was found to be significantly predictive in the drop of vaccine coverage over time. Internet-based interventions to address vaccine hesitancy were found in a study to improve vaccine attitudes.[12] Vaccine information and social media components that allow for interaction led to significant reductions in vaccine-related doubts and concerns when compared to standard advice.

Our study has shown, that promoting to a wide general audience may yield not as high a number of requests for vaccination. Information about vaccinations obtained from social media, affect decisions and attitudes. A couple of studies found that lower rated attitudes for vaccination and higher odds of developing vaccine hesitancy in people influenced by social media and rarely getting information from valid sources such as World Health Organization websites.[20,21] Targeted marketing, particularly to hesitant members of the population and addressing their fears and doubts could lead to higher demand for vaccination. Misinformation and comments showing hesitancy and doubts on vaccine safety should be monitored during the promotional campaign. There could be an online forum to discuss these concerns and correct any misinformation. Advocating for more critical consumers of information and being able to critic sources of information online, may be a factor that needs more attention and study. It has been found that high media literacy can minimize impact of disinformation against vaccination while strengthening the promotion of the overall benefits of vaccination.[14] Piloting of the information dissemination of social media could have also provided more requests for vaccination. With the limited time frame of the preparation and data collection periods, these factors were not identified in a timely

manner for adjustments to be made. These strategies may be implemented on future continuations of the service.

Other factors identified in a previous study by Bernales included vaccination cost and accessibility as hindrances to vaccination.[8] The cost of the vaccine and delays in procurement due to the complicated process of obtaining vaccines for the hospital were seen as hindrances. Since the start of the pandemic, local health units have also included vaccination drives for influenza and pneumococcal vaccines. The city of Makati, for example had a large-scale flu and pneumonia vaccination drive at the start of the COVID-19 pandemic.[22] With such programs in place in some localities, patients may have opted to avail of these services instead because it will be paid for by their local government. The promotion via social media may have increased awareness for the need for vaccinations, but a high number of requests was not seen due to more accessible and free vaccines from the local health units.

Increasing coverage of pneumococcal and influenza vaccines and promoting awareness to update these vaccines is an important public health strategy, especially in the context of the COVID-19 pandemic. Social media promotion should address misinformation that causes vaccination hesitancy in order to increase vaccine utilization. Using social media platforms to reach out to people can potentially address these concerns and eventually increase vaccine coverage.

## CONCLUSION

A telehealth-based vaccination system was set-up at the outpatient department of a tertiary hospital, with promotion of vaccinations against pneumonia and influenza via social media for one month without posters and another month with posters. Social media promotion of vaccination with posters resulted in a slight increase in the number of vaccination requests. Promotion of the safety and efficacy of vaccines are imperative in promoting health and wellness, and this includes raising awareness and combating mistrust. In a world where information is readily available, social media as a platform is both an opportunity and threat to vaccine promotion. The points found in this study may be used in further promotional strategies to streamline future vaccination systems in different contexts and institutions.

### Statement of Authorship

Both authors certified fulfillment of ICMJE authorship criteria.

### Author Disclosure

Both authors declared no conflicts of interest.

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