

Vaccine Literacy Among Asian and Arab Americans in Michigan: A Promising Practice Evaluation

¹Meriam Caboral-Stevens, ²Maria Amy Risvold, ³Corazon Gabarda, ⁴Concepcion Sumalde

¹(School of Nursing, Eastern Michigan University, USA)

^{2,3,4}(Philippine Nurses Association of Michigan, USA)

ABSTRACT

Since the COVID-19 pandemic, well-established organizations have published massive health communications regarding vaccination. The overwhelming amount of information makes it difficult for individuals to determine true information making sound and informed decisions challenging, particularly those with limited health literacy. Vaccine literacy is important in eliminating vaccine hesitancy. The overall goal of this project was to examine vaccine literacy among Asian and Arab Americans living in Southeast Michigan (MI). A quantitative cross-sectional survey was conducted. Eligible participants were Asian and Arab Americans, 18 years and older living in MI. Participants were recruited and surveyed by trained culturally congruent community ambassadors (CAs). The 76-items COVID-19 Vaccine Literacy Scale by Biasio was adapted, with permission, to measure vaccine literacy. Five hundred twenty participated in the survey. The mean score in functional literacy (FL) was 2.36 (SD=.85), whereas the mean score in the interactive-critical (IC) literacy was 3.07 (SD=.64). About 54% of the participants had an FL score of <2.5, and 15.7% had an IC literacy score of <2.5. In summary, working with the community in disseminating health messages, and tailoring messages that reflect the values and beliefs of the community are effective strategies in increasing vaccination uptake.

KEYWORDS: *Asian Americans, Arab Americans, COVID-19 vaccination, health communication messages vaccine literacy.*

1. INTRODUCTION

Since the beginning of coronavirus (COVID-19) pandemic, well-established organizations have published massive health communications on infection control and prevention, including handwashing, wearing masks, social distancing, and getting vaccinated against the COVID-19 and influenza. However, considering the large amount of contradictory news among the scientific community, the news media, social media and other lay sources, people have experienced what is called COVID-19 infodemics. The World Health Organization [1] defined infodemics as “too much information including false or misleading information in digital and physical environments during the disease outbreaks.” The overwhelming amount of information made it difficult to determine true information, hence making sound and informed decisions challenging, particularly among those with limited health literacy. Health literacy has been considered one of the biggest drivers of health behaviors across all ages and a strong predictor of health outcomes [2,3] It is one of the factors related to vaccine hesitancy [4,5].

During COVID-19, one of the most powerful health interventions being delivered by the scientific community was getting vaccinated to achieve herd immunity [6]. Vaccine acceptance is important to achieve herd immunity, which could be undermined by vaccine hesitancy among the public [6]. Vaccine literacy has been considered a promising technique towards eliminating vaccine hesitancy [3].

1.1. Our Organization

The Philippine Nurses Association of Michigan [7] is a non-profit organization that serves nurses and the Filipino community in the state of Michigan (MI). During COVID-19, the organization received funding from the Center for Disease Control and Prevention (CDC) to increase confidence and update about COVID-19 and flu vaccinations within the Asian/ Asian American and Arab/Arab American communities. In addition to training influential messengers and setting up vaccination clinics, it disseminated health messages using various communication modes to the target population. The CDC grant activities were implemented starting in 2021. In

the middle of 2022, the organization received funding from Urban Institute to conduct a promising practice evaluation of the activities implemented by the organization during COVID-19. Examining vaccine literacy of various communities served by this organization during COVID-19 was the outcome in this promising practice evaluation. Promising practice evaluation examined the organization's COVID-19 and flu vaccination initiatives during the pandemic. Promising practices are activities that have shown benefit to the community but have not been rigorously evaluated [8]. It offers evidence on the effectiveness of small-scale programs or interventions with the potential to generate actionable data as well as generalizing results to diverse populations or communities [8].

2. REVIEW OF THE LITERATURE

Vaccine literacy is defined as “not simply knowledge about vaccines, but also developing a system with decreased complexity to communicate and offer vaccines as sine qua non of a functioning health system” [9]. The aim is to change the social norm; thus, advancing vaccine uptake by the public. An important step in increasing vaccine acceptance is improving the way the public understands health information [7]. Biasio et al. 's [4] COVID-19 Vaccine Literacy Scale, identified three dimensions of vaccine literacy— functional literacy, interactive literacy, and critical literacy which was adapted from Nutbeam [10]. Functional literacy refers to the reading and writing skills necessary to function effectively in everyday activities. Interactive literacy is more advanced cognitive, social, and literacy skills, needed to actively participate, extract, and derive meanings from various communication methods, and apply them based on situations. Critical literacy refers to being far advanced, which entails critically analyzing information and using it to exert greater control over life and situation [10].

GOAL & OBJECTIVES

The overall goal of this project was to conduct a promising practice evaluation of the organization's activities related to COVID-19 and flu/influenza vaccination. The objectives were: 1) to examine vaccine literacy, attitudes and perceptions, and beliefs and behaviors to COVID-19 and flu vaccinations among Asian and Arab Americans living in MI; and 2) to identify lessons learned by the organization in regards to their COVID-19 and flu/influenza initiatives.

3. METHODS

3.1 Design, Sample, Setting

A quantitative, cross-sectional program evaluation was conducted. A convenience sample of self-reported Asian and Arab Americans, 18 years and older living in various counties of MI were eligible to participate in this study. Participants were recruited and surveyed by culturally congruent community ambassadors (CAs).

3.2 Instrument

Blasio's COVID-19 Vaccine Literacy Scale [4] was adapted and translated to measure vaccine literacy. The survey consisted of 76-items (16-item vaccine literacy, 5-item knowledge, 7-item attitudes and perception, and 7-item beliefs and behaviors). The vaccine literacy scores used range from 1-4, with higher scores indicating higher VL. A score of ≤ 2.5 has been designated by Biasio [4] as having a limited literacy score. For the purpose of this project, the survey was translated into Simplified Chinese, Korean, Arabic, and Thai languages by community ambassadors. Permission to adapt and translate the instrument was obtained from Dr. Blasio.

3.3 Data Collection

The project utilized culturally congruent CAs to collect surveys from their community members. Community ambassadors were influential messengers, health coaches, community health navigators or other community members from various Asian and Arab American communities. Twenty-one CAs were recruited and trained to conduct data collection. A two-hour training was provided for the CAs, which included human subject training conducted by a university research director. The CAs consisted of six Filipinos, one Chinese, two Thai/Laos, one Indian, one Korean, one Hmong, two Vietnamese, one Nepalese, one Burmese, three Bangladeshi and two Arabs. After completing the required training, CAs recruited participants, obtained consent forms, and distributed surveys to community participants. Participants can choose whether to complete the English version or the translated version of the survey. After completing the survey, participants were given a \$10.00 gift card as incentive. The CAs received \$15.00 incentives for each completed survey returned to the investigators. Data collection was conducted from November 2022 to February 2023.

3.4 Ethical Consideration

The Institutional Review Board from Eastern Michigan University granted an exempt approval for the study. Consent form and survey were translated into Simplified Chinese, Arabic, Thai, and Korean languages. Consent form was obtained from all participants by the CAs.

3.5 Data Analysis

The Statistical Packages for Social Sciences (SPSS) version 26 was used in data analysis. Descriptive statistics including the mean, standard deviations, frequency, and percentages were used to analyze the data.

4. RESULTS

4.1 Demographic Data

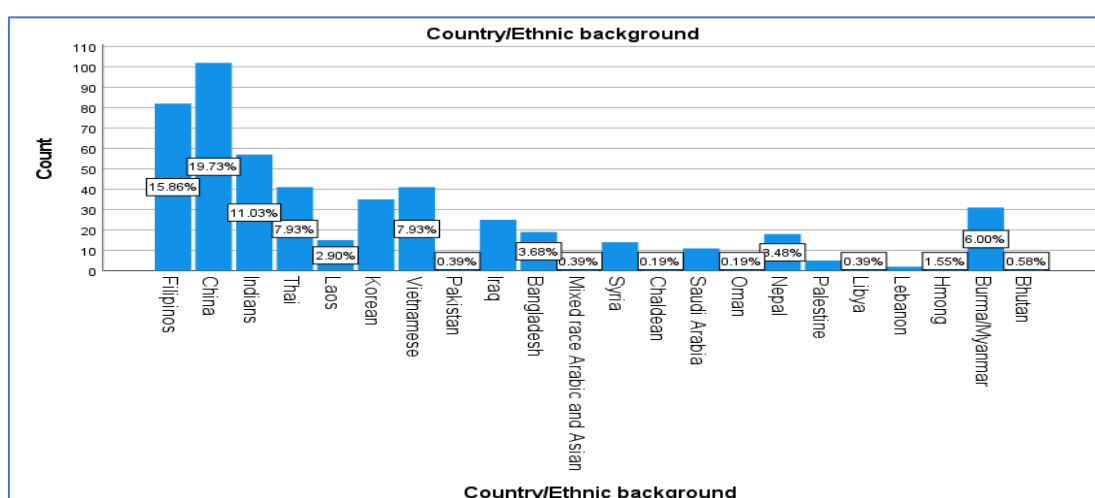
Five hundred twenty-seven surveys were distributed and 523 were returned by the CAs (99% return rate). Participants consisted of 59% females with a mean age of 54.7 (SD= 20.1; range age:18 to 93) years of age, over 57% were married, and 44% completed a college degree and higher. About 46% of the participants were diagnosed with COVID-19, of which 56% diagnosed did not seek medical care. Table 1 presents the demographic characteristics of participants. Eighty-six percent of the participants were Asians/Asian Americans. Chinese (19.5%), Filipinos (15.7%), and Indians (10.9%) were the top three Asian groups, whereas Iraqis (4.8%), Syrians (2.7%), and Saudi Arabians (2.1%) are the top three Arab Americans. See Fig. 1 for the distribution of the various Asian and Arab Americans who participated.

Table 1. Demographic Characteristics (n=523)

Categories	Frequencies (n)
Age (mean)	54.7 (SD= 20.1) years old [range – 18-93] (n= 462)
Age Categories	% (n)
18-25 years' old	7.1% (37)
26-35 years' old	11.9% (62)
36-50 years' old	20.1% (105)
51-65 years' old	18.2% (95)
Over 65 years' old	31.2% (163)
Missing	11.7% (61)
Sex at birth	% (n)
Male	40.0% (209)
Female	59.3% (310)
Intersex	0.4% (2)
Prefer not to disclose/Missing	0.4% (2)
Marital Status	% (n)
Single	18.5% (97)
In a relationship	7.1% (37)
Married	57.6% (301)
Separated/Divorced	5.0% (26)
Widow/er	9.8% (51)
Missing	2.1% (11)
Highest Educational Level	% (n)
Elementary	5.7% (30)
Completed Elementary	3.6% (19)
High School	15.3% (80)
Completed High School	13.8% (72)
College Credit	13.6% (71)
Completed College and Higher	44.0% (230)
Missing	4.0% (21)
Racial and Ethnic Distribution	% (n)
Asian/Asian Americans	86.2% (451)
Arab/Arab Americans	13.4% (70)
Mixed	0.4% (2)
Language spoken at home	% (n)
Arabic	6.9 (36)
Bangla	1.0 (5)
Burmese/Karen	5.5 (29)
Chinese/Mandarin	18.5 (97)
English	19.1 (100)
Filipino dialect	8.0 (42)
Hmong	1.5 (8)
Indian/Hindi/	8.8 (46)
Korean	5.9 (31)

Nepalese	3.8 (20)
Thai/Lao	7.6 (40)
Vietnamese	4.8 (25)
Missing	8.4 (44)
Birthplace	% (n)
U.S. born	10.3% (54)
Non-US born	89.1% (466)
Missing	0.6% (3)
Years living in U.S.	20.6 years (SD=14.1, range:1-59 years) (n=416)
Occupation	% (n)
Professional	23.5% (123)
Non-professional	27.9% (146)
Retired	12.0% (63)
Students	5.4% (28)
Religious (Priest, monks)	1.9% (10)
Unemployed or No	5.2 (27)
Others (including housewife or others whose job is not disclosed, or Missing)	24.1 (126)
COVID-19 diagnosis	% (n)
Yes	45.5% (238)
No	46.3% (242)
Do not know	7.6% (40)
Missing	0.6% (3)
Treated for COVID-19 (if answered “Yes” to COVID-19 diagnosis)	% (n)
Did not seek medical care	40.0% (94)
Sought medical care but not hospitalized	3.8% (9)
Hospitalized	1.7% (4)
Missing	
Up-to-date with vaccination	% (n)
Yes	79.2% (414)
No	3.8% (20)
Partially	11.5% (60)
Will not get vaccinated	4.8 (25%)
Missing	0.8% (4)

Fig. 1. Country of Origin Among Participants (n=523)



4.2 Vaccine Literacy

The overall mean vaccine literacy scores and percent of participants in each category are presented in Table 2. The mean score in functional literacy (FL) was 2.36 (SD=.85; possible score ranges from 1-4); whereas the mean score in the interactive-critical (IC) literacy was 3.07 (SD=.64; possible score ranges from 1-4). About 54% of the

participants had an FL score of <2.5, and 15.7% had an IC literacy score of <2.5. Table 3 presents the mean FL and IC literacy scores per age category.

Table 2. Overall Vaccine Literacy Scores

	Functional literacy¹ (FL) score (mean) (n=517)	Interactive-Critical² (IC) Score (mean) (n=518)
Total cohort (out of a max score of 4 for each)	2.36 (SD=.85); median=2.25	3.07 (SD=.64); median=3.1
Vaccine Literacy Score Range		
1 (1-1.49)	14.3% (74)	2.5% (13)
2 (1.5-2.49)	40.3% (208)	13.2% (69)
3 (2.5-3.49)	31.4% (163)	54.5% (285)
4 (3.5-4)	14.3% (43)	29.6% (154)
Male (n=208)	2.40 (SD=.86)	3.08 SD=.61)
Female (n=309)	2.35 (SD=.85)	3.06 (SD=.66)

¹ FL- questions mainly about language, involving semantic systems;

² IC- questions focused more on cognitive efforts, such as problem-solving and decision-making

Table 3. Mean Vaccine Literacy by Age Category

Age Category	Functional Literacy Score (mean [SD]) (n=461)	Interactive-Critical Literacy Score (mean)
18-25 years old	2.95 (SD=.74)	3.19 (SD=.55)
26-35 years old	2.49 (SD=.83)	3.15 (SD=.55)
36-50 years old	2.38 (SD=.78)	3.24 (SD=.61)
51-65 years old	2.33 (SD=.81)	3.02 (SD=.68)
> 65 years old	2.22 (SD=.88)	2.92 (SD=.70)

4.2.1 Correlations between variables

Using Pearson’s r correlation, a statistically significant negative correlation was noted between age and FL score (r=-.208, p<.001) and IC literacy score (-.211, p<.001). There was no statistical difference in the mean FL between men and women (2.40 [SD=.86] vs 2.35 [SD=.85]), and IC literacy scores between men and women (3.08[SD=.61] vs 3.08 [SD=.66]). Women were found to have lower FL and IC literacy scores; however, they were not statistically significant. There was a statistically significant positive correlation between educational attainment and FL scores (r=.407, p <.001), and between educational attainment and IC literacy scores (r=.372, p<.001).

4.3 Knowledge

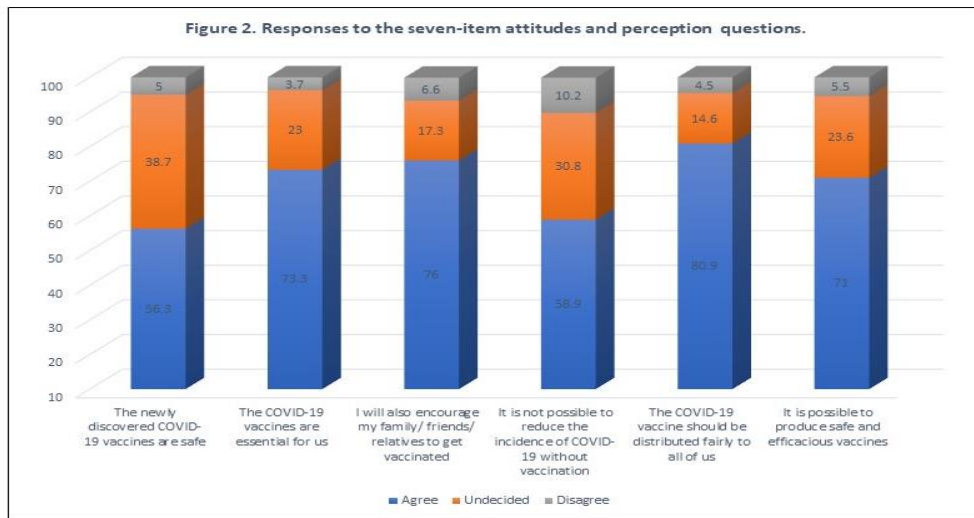
There were five questions that evaluated knowledge of vaccine safety and effectiveness. About 77% of participants believe that COVID-19 vaccines were either effective or very effective, 19% believed somewhat effective and 4% believed that the COVID-19 vaccine was not effective. Fifty-nine percent of participants responded that vaccines were not dangerous, 34% were somewhat dangerous, and 8% thought vaccines were very dangerous. About 10% of the participants believed vaccinations increase allergic responses, whereas 44% were unsure. Majority of the participants (51%) were not sure whether vaccinations cause autoimmune diseases such as lupus.

4.4 Attitudes and Perception

Overall, attitudes towards vaccines were positive. See Fig 2 for participants’ agreement or disagreement to the statements. In addition, about 87% of the participants reported that COVID-19 vaccines are either safe or

somewhat safe, whereas 5% believed that COVID-19 vaccines were not safe at all. About 8% of the participants were unsure whether the vaccine is safe or not.

Fig 2. Responses to the Seven-item Attitudes and Perception Statements



4.5 Belief and Behaviors

Almost 80% of the participants were up to date with the COVID-19 vaccination. Being up-to-date means the participant had received two doses of Moderna or Pfizer or one dose of Johnson and Johnson plus booster shots. About 5% of the participants reported that they would not get vaccinated with COVID-19. Almost 75% of participants have already received their flu vaccine for the year. Table 4 presents responses to the beliefs and behaviors questions

Table 4. Responses to the seven-item beliefs and behaviors questions.

	Yes	No	Partially	Will not get vaccinated
Are you up-to-date with COVID-19 vaccination? (n=519)	79.8% (414)	3.9% (20)	11.5% (60)	4.8% (25)
Will you take COVID-19 vaccine if it is to be given every year? (n=519)	77.9% (405)	22.1% (115)		
Have you been vaccinated against flu this year? (n= 513)	74.3% (382)	25.7% (132)		
	Yes	No		
Will you get vaccinated against flu this year? (n=119)	29.4% (35)	70.6% (84)		
	Yes	No	Unsure	
Do you plan to get vaccinated against infectious diseases, such as TB, measles, chicken pox, Hepatitis, pneumonia) (n=516)	75.6% (391)	7.4% (38)	17% (88)	
<i>How much do you agree with the following statements?</i>	Totally	A little	Partially	Not at all

I am NOT in favor of vaccines because they are unsafe (n=518)	5.8% (30)	11.6% (60)	23.2% (120)	59.3% (308)
There is no need to push to vaccinate because natural immunity exists. (n=517)	8.9% (46)	19.3% (100)	26.5% (137)	45.3% (234)

4.6 Successes and Challenges

We have had several successes in this project despite only having to complete in six months. The project exceeded the target sample of 500. Using trained CAs to collect the data within their own communities has been effective and CAs were able to reach a significant number of participants that we had to stop due to budget constraints. Even small incentives given to participants and community ambassadors made collecting the data easier.

Despite the successes, we faced several challenges in this project. Since there was a significant time delay (from early summer to October) in initiating the project, some CAs recruited during the summer were not available to participate in the fall. Even though we were able to get 13% participants from the Arab/Arab American communities, we would have liked to have more or at least 25% of the sample size. The delay in starting the project may have prevented us from recruiting with this community. Another challenge was some participants did not answer some questions completely, which led to several missing data. On several occasions, we had to request the CAs to obtain the information that was missing from the community participant. It was also noted during input of data that some answers within the same family or community were noted to be group answers, meaning those from one family have similar answers, which could lead to bias. It was surprising that some Asian and Arab groups preferred the English survey rather than the translated survey. We were not able to get participants from the Japanese community. One of the Japanese community leaders we approached and invited to be a CA declined, stating that their community usually do not participate widely in projects that is outside their own community.

4.7 Lessons Learned

Through our successes and challenges in the six months of conducting this project, we have two lessons learned – 1) working with the community in disseminating health messages, and 2) tailoring messages that reflect the values and beliefs of the community are effective strategies. Participating in this promising practice project has been very informative in examining our organization's community activities. This project emphasized the importance of evaluation as part of the organization's activities. Evaluation is a form of reflection on the organization and assists in whether there is a need to change or review the strategic priorities of the organization.

5. DISCUSSION

This study was conducted to examine vaccine literacy, attitudes and perceptions, and beliefs and behaviors to COVID-19 and flu vaccinations among Asian and Arab Americans living in MI. Our study showed that Asian and Arab Americans living in MI have a lower FL score but a higher IC score. These results were consistent with findings among general adult populations in Italy [4], and older Thai [11] using the same instrument. However, the result is contrast with Li et al.'s [12] study of Chinese residents and Alshehry et al.'s [13] study on nursing students in Saudi Arabia, in which IC score was lower than FC. This could be interpreted that our population had a higher cognitive ability to decide and judge than understanding the information. Since majority of the participants have completed college degree or higher, they have the ability to comprehend educational materials help them make informed decision about getting vaccinated. This is also evident the positive correlation between VL and educational attainment. It has been suggested that having higher IC is a significant predictor of willingness to get vaccinated [13]. On the other, the low FL score is significant for organizations to know, particularly in developing communication messages.

Another finding is that age negatively correlated with both FL and IC, which means that the older the person, the lower their FL and IC. This is also not surprising as older adults have problem with print materials, documents, and with numbers [14]. Similarly, older Asians have limited English proficiency as well as low literacy that migrate to the U.S. do not speak English [15]. This shows the importance of promoting health literacy among older adults to reduce health disparities.

Results also showed that the majority of participants believed COVID-19 vaccines were either effective or very effective and that it was safe. This is very encouraging as positive attitudes and beliefs about vaccines increase uptake in the community, hence achieving herd immunity. This also has important implications in regards to the effectiveness of health communication messaging.

This study acknowledges some limitations. The number Arab Americans who participated was low and some Asian American communities were not willing to participate. The study only studied Asian and Arab Americans, it did not include other racial and ethnic groups. Particularly Blacks and Hispanics since they also have low vaccination rates.

6. CONCLUSION

In summary, this promising practice program evaluation allowed us to examine our organization's efforts in disseminating health information during the pandemic. This project helped identify the organization's strengths and weaknesses, and lessons learned in providing community service during COVID-19.

7. ACKNOWLEDGEMENTS

We would like to acknowledge all the Community Ambassadors who assisted in the data collection, without them we would not have completed this project on time.

This project was funded by the Urban Institute Grant Sub-Award#:102351-0002-06-PNAM-01

REFERENCES

1. World Health Organization. Info emic. 2023. <https://www.who.int/health-topics/infodemic>
2. A. Park, TL Ecker, MJ Zaso, LAJ Scott-Sheldon, PA Vanable, KB Carey, K. B., Ewart, C. K., and Carey, M. P. Associations between health literacy and health behaviors among urban high school students. *Journal of School Health*, 87(2), 2017, 885-893.
3. H. Zhang, L Chen, and F. Zhang Revisit the effects of health literacy on health behaviors in the context of COVID-19: The mediation pathways based on the Health Belief Model. *Frontier of Public Health*, 10, 2022, 10: 917022.
4. LR Biasio, G Bonaccorsi, C Lorini, and S Pecorelli. (2021). Assessing COVID-19 vaccine literacy: a preliminary online survey. *Human Vaccine Immunotherapies*, 17(2), 2021, 1304-1312
5. I Song, and SH Lee. (2023). COVID-19 vaccine refusal associated with health literacy: findings from a population-based survey in Korea. *BMC Public Health*, 23(1), 2023, 225
6. A White. Evidence-based strategies to promote vaccine acceptance. *British Journal of Community Nursing*, 26(7), 2021, 338-343.
7. Philippine Nurses Association of Michigan. Our History. <https://www.pnamichigan.org/about-pnam>
8. Health Center Resource Clearinghouse. Promising practices. <https://www.healthcenterinfo.org/promising-best-practices/>
9. SC Ratzan (2011). Vaccine literacy: a new shot for advancing health. *Journal of Health Communication*, 16(3), 2011, 227-229.
10. D Nutbeam. Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century. *Health Promotion International*, 15(3), 2000, 259-267.
11. Kittipimpanon, K., Maneesriwongul, W., Butsing, N., Janepanish Visudtibhan, P., & Leelacharas, S. COVID-19 vaccine literacy, attitudes, and vaccination intention against COVID-19 among Thai older adults. *Patient preference and adherence*, 16, 2022, 2365–2374. <https://doi.org/10.2147/PPA.S376311>
12. Li Y, Guo Y, Wu X, Hu Q, Hu D. The development and preliminary application of the Chinese version of the COVID-19 vaccine literacy scale. *International Journal of Environmental Research and Public Health* 19(20), 2022, 13601. <https://doi.org/10.3390/ijerph192013601>
13. Alshehry AS, Cruz CJ P, Alquwez N et al. (2022). Predictors of nursing student's intention to receive COVID-19 vaccination: A multi-university study in Saudi Arabia. *Journal of Advanced Nursing*, 78(2), 2022, 446-457. <https://doi.org/10.1111/jan.15002>
14. Centers for Disease Control and Prevention (2009). Improving Health Literacy for Older Adults: Expert Panel Report 2009. U.S. Department of Health and Human Services: Atlanta
15. Tsoh JY, Sentell T, Gildengorin G. Healthcare communication barriers and self-rated health in older Chinese American immigrants. *Journal of Community Health*, 41(4), 2016, 741–752. <https://doi.org/10.1007/s10900-015-0148-4>