

Acceptance of Covid-19 Vaccine Among the People of Al-Jabal Al-Akhdar District in Libya as of April 2021

Gladys N. Abrina¹, Joanne Faith N. Abrina² & Grace N. Abrina³

¹Faculty of Nursing, Omar Al-Mukhtar University, Al-Bayda, Libya.

²College of Nursing and Health Sciences, Palawan State University, Puerto Princesa City, Palawan, 5300, Philippines.

³Graduate School, Palawan State University, Puerto Princesa City, Palawan, 5300, Philippines.



DOI: <http://doi.org/10.38177/AJBSR.2021.3306>

Copyright: © 2021 Gladys N. Abrina et al. This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Article Received: 21 June 2021

Article Accepted: 29 August 2021

Article Published: 30 September 2021

ABSTRACT

Background: In the midst of the worldwide effort to control the spread of the COVID-19 thru immunization of herd immunity, there is still the doubt about the effectiveness of the vaccine. Thus, the vaccine hesitancy. This is a threat to public health. Knowing and understanding the factors that influence the COVID-19 vaccine acceptance of the community may contribute in creating new and improved strategies for a better comprehensive vaccination program. The objective of this study was to evaluate the frequency of the acceptance of COVID-19 vaccine and their determinants as of April 2021 in the Al-Jabal Al-Akhdar, Libya.

Methods: This is cross-sectional quantitative research was conducted using stratified random sampling while observing strict precautionary measures. In April 2021, guided questionnaires were answered by 2,000 respondents. Sample distribution were as follows: 500 from Al-Bayda, 200 from Shahat, 100 from Sussa, 100 from Massah, 100 from Omar Al-Mukhtar, 100 from Labraq, Mansoura, Gernada, and Gubbah 170 from Jardes and Marawa, 170 from Faydiya and Gasser Libya, 170 from Haniya and Zawiat Al-Argub, 220 from Werdama, Sidi Abdul Wahad and Hamama, 170 from Gandula and Slanta. Results were validated and analyzed using Minitab version 17.1. Data were presented using texts and tables.

Results: Out of the 2,000 invitees, 956 expressed their willingness to take the vaccine if it is available. Interest in accepting the vaccine is relatively high among 18-25 age group (711), male (781), being married (779), with bachelor's degree (475), employed by government (878), and with Libyan nationality (951). Upon cross-tabulation using chi-square, results showed that the proportion of the age group 18-25 ($X^2=870.206$, p-value=0.00001), of male ($X^2=664.153$; p-value=0.00001), of being married ($X^2=967.552$; p-value=0.00001), of being a Libyan ($X^2=65.443$; p-value=0.00001), of being a bachelor's degree ($X^2=728.872$; p-value=0.00001); and of being a government employee ($X^2=1007.334$; p-value=0.00001) were significant factors associated vaccine acceptance. Moreover, respondent's perception whether the COVID-19 vaccine will help prevent the spread of disease ($X^2=1429.099$; p-value=0.00001), their trust in the health system of Libya ($X^2=1327.565$; p-value=0.00001), their idea whether the COVID-19 vaccine has a side-effect ($X^2=992.959$; p-value=0.00001), and their fear of the side-effects of the COVID-19 vaccine are also key determinants that predict COVID-19 vaccine acceptance.

Conclusion: Identifying key factors relating to COVID-19 vaccine acceptance may aid in intensifying the global immunization drive. Health education must be reinforced to expedite achieving herd immunity using the social media and proper health education elsewhere.

Keywords: Vaccine, Vaccine hesitancy, Vaccine acceptance, COVID-19, Coronavirus, Libya.

Methods

Study Design and Setting

This quantitative cross-sectional survey was conducted using stratified random sampling method where the participants came from the different areas of the Al-Jabal Al-Akhdar District in Libya.

Study Sample

The investigator determined the total number of sample according to the latest survey conducted by the Bureau of Statistics and Census in Libya. Al-Jabal Al-Akhdar District has a population of 250,020 as of January 2021, (<https://www.libyaherald.com/2021/01/22/libyas-population-was-6931061-in-2020-census-bureau/>).

Using sample size calculator (<https://www.checkmarket.com/sample-size-calculator/>), the researcher determined their sample size with a confidence level of 95% and at around 2% margin of error. The ideal number of respondents at 2% margin of error is 2,379. Only 2,000 total respondents were included in the study. Sample

distribution were as follows: 500 from Al-Bayda, 200 from Shahat, 100 from Sussa, 100 from Massah, 100 from Omar Al-Muhktar, 100 from Labraq, Mansoura, Gernada, and Gubbah 170 from Jardes and Marawa, 170 from Faydiya and Gasser Libya, 170 from Haniya and Zawiat Al-Argub, 220 from Werdama, Sidi Abdul Wahad and Hamama, 170 from Gandula and Slanta. Hence, the total sample is 2000. More samples were included in areas with higher population. People who can't give response like critically-ill, those who are unable to communicate (deaf, mute, blind), people with mental problem were excluded in the study. All respondents don't manifest any flu-like symptoms during the time of survey.

Questionnaire Development

After conducting a literature review, key areas were identified. Questionnaire was drafted in English, then in Arabic. Sociodemographic data, desire to take the vaccine whenever possible, perception towards COVID-19 vaccine, and their confidence on the health care system were examined. The draft questionnaire was assessed and scrutinized by the Faculty of Nursing. It underwent pilot testing. The final questionnaire was kept concise. Options were given for the sociodemographic characteristics. For the other remaining inquiry, close-ended questions were asked. The respondents were instructed to select one option from the list if responses (Yes/ No/ Not Sure).

Ethical Consideration

Ethical approval was obtained from the ethical review committee of Omar Al-Mukhtar University, Faculty of Nursing, and supportive letters were obtained as well. Clear communication was conducted accordingly. Informed verbal consent was obtained. Privacy and confidentiality were maintained. Participants were assured that they will never face anything for their participation. Strict health precautionary measures like the use of alcohol, face-mask and face-shields, social distancing, and limited time exposure were observed during the collection of data.

Data Management and Analysis

Data entry and validation were done in Minitab Version 17.1. The outcome variables of this study were to determine the acceptance of the COVID-19 vaccine among the people of Al-Jabal Al-Akhdar, Libya as of April 2021. Descriptive statistics were conducted to create summary tables for the variables. A cross-tabulation analysis was done to scrutinize the distribution of intention to take COVID-19 vaccine, their idea on the action of vaccine, their knowledge and fear of the side-effects of the vaccine, their trust in the health system of the country with the respondent's sociodemographic profile using chi-square. A two-tailed p-value <0.05 was considered statistically significant.

Results

The 2,000 questionnaires were returned and were answered completely. All subjects agreed to include their answers in the study. Table 1 displays the frequency of the sociodemographic profile of the respondents. Most of the participants were within the age bracket of 18-25 which is 860 (43%). On the other hand, ages 45 and above has the least number of respondents with only 234 (11%). Male dominated the female, 1032 and 968, respectively. Around 46% (918) were married, followed by the single at around 42% (839). Only 4% (88) of the respondents are non-Libyan. 878 (43.9%) of them finished a Bachelor's degree but only 222 (11.1%) proceeded to post-graduate

education. Majority of them are working. 1108 (55.4%) are working for the government while 484 (24.2%) are self-employed.

Table 1. Sociodemographic Profile of the Study Population (N=2000)

Variables	Category	F	%
Age	18 to 25	860	43.00
	26 to 35	552	27.60
	36 to 45	354	17.70
	45 and above	234	11.70
	Total	2000	100
Gender	Male	1032	51.60
	Female	968	48.40
	Total	2000	100
Marital Status	Married	918	45.90
	Single	839	41.95
	Separated/Divorced/Widowed	243	12.15
	Total	2000	100.00
Nationality	Libyan	1912	95.60
	Non-Libyan	88	4.40
	Total	2000	100.00
Education	Diploma	515	25.75
	Bachelor	878	43.90
	High School	385	19.25
	Post Graduate	222	11.10
	Total	2000	100.00
Occupation	Government	1108	55.40
	Self Employed	484	24.20
	Not Working	408	20.40
	Total	2000	100.00

Table 2 presents the acceptance of COVID-19 vaccine, perception, knowledge, and the proportion of people who trust the health care system of Libya. Of the 2,000 respondents, 1044 or 52.2% expressed not to take the vaccine whenever it will be available in the country. 502 (25.10%) think that vaccine will not help in preventing the spread of the disease (coronavirus) and 695 (34.75%) is not sure whether the vaccine can aid in controlling the communicability of COVID-19. Result shows that 881 (44.05%) of the interviewee don't trust the health care system of the country. On the other hand, 780 (39%) trust the healthcare offered by the government. 46.70% of the population understand that the vaccine has side-effect, and majority of the population, 1025 (51.25%), are afraid of the side-effect/s of the vaccine.

Table 2. COVID-19 Vaccine Acceptance in Al-Jabal Al-Akhdar District of Libya (N=2,000)

Variables	Yes	No	Not Sure
If the COVID-19 vaccines arrive in Libya, will you get the vaccine?	956 (47.80%)	1044 (52.20%)	-
Do you think the COVID-19 vaccine prevents the spread of the disease?	803 (40.15%)	502 (25.10%)	695 (34.75%)
Do you trust the health system of Libya?	780 (39.00%)	881 (44.05%)	339 (16.95)
Do you think COVID-19 vaccine has side-effects?	934 (46.70%)	560 (28.00%)	506 (25.30%)
Are you afraid of the side-effects of the vaccines?	1025 (51.25%)	465 (23.25%)	510 (25.50%)

Table 3 illustrates the cross-tabulation of the profile of the subjects and their intent to accept the COVID-19 vaccine. Result states that from the 956 respondents who accepts the vaccine, majority (711) belongs to 18-25 age group while 234 out of 234 respondents who are 46 and above are hesitant to take the vaccine: with $X^2=870.206$ and p-value of 0.00001, there is significant relationship among variables . Greater fraction male (781 out of 1032) are more likely to accept the vaccine than female (175 out of 968): with $X^2=664.153$ and p-value of 0.00001, there is significant relationship among variables.

Participants who were married (779 out of 918) are also more inclined to take the vaccine. On the contrary, the separated/widowed/divorced show extreme hesitancy on the vaccine (234 out of 234) with $X^2=967.552$ and p-value of 0.00001, there is significant relationship among variables. Larger proportion of Libyans (951 out of 1912) accept the vaccine compared to the non-Libyans (5 out of 88) with $X^2=65.443$ and p-value of 0.00001, there is significant relationship among variables. Out of the 878 bachelor's degree holder, 475 are willing to be vaccinated while A huge proportion of diploma graduates (442 out of 515) would subject themselves to vaccination: $X^2=728.872$ and

p-value of 0.00001, there is significant relationship among variables. Government employees have also higher chances of taking the vaccine (878 out of 1108) as opposed to the unemployed which shows zero (0 out of 408) acceptance of the vaccine, with $X^2=1007.334$ and p-value of 0.00001, there is significant relationship among variables.

Table 3. Cross-Tabulation between Sociodemographic Profile and intent to take the COVID-19 Vaccine (N=2000)

Variables	Category	Yes	No	All	Chi-Square (X^2)	p-value
Age	18 to 25	711	149	860	870.206	0.00001
	26 to 35	215	337	552		
	36 to 45	30	324	354		
	46 and above	0	234	234		
	Total	956	1044	2000		
<i>Degree of Freedom = 3</i>						
Gender	Male	781	251	1032	664.153	0.00001
	Female	175	793	968		
	Total	956	1044	2000		
<i>Degree of Freedom = 1</i>						
Marital Status	Married	779	139	918	967.552	0.00001
	Single	177	662	839		
	Separated/Divorced	0	243	243		
	/Widowed		243			
	Total	956	1044	2000		
<i>Degree of Freedom = 2</i>						
Nationality	Libyan	951	961	1912	65.443	0.00001
	Non-Libyan	5	83	88		
	Total	956	1044	2000		
<i>Degree of Freedom = 1</i>						
Education	Diploma	442	73	515	728.872	0.00001

	Bachelor	475	403	878		
	High School	24	361	385		
	Post Graduate	15	207	222		
	Total	956	1044	2000		
<i>Degree of Freedom = 3</i>						
Occupation	Government	878	230	1108	1007.334	0.00001
	Self Employed	78	406	484		
	Not Working	0	408	408		
	Total	956	1044	2000		
<i>Degree of Freedom = 2</i>						

Table 4 presents the cross-tabulation of the intent to take the vaccine and their perception on the vaccine and their trust on the health care delivery system of Libya. Among those who accept the vaccine, majority (738 out of 956) believes that vaccine will help in preventing the spread of the disease, with $X^2=1429.099$ and p-value of 0.00001, there is a significant relationship between variables. The table show that out of 881 respondents who don't trust the health care system of Libya, 689 wouldn't want to take the vaccine. On the contrary, from the 780 who trust the health care system of Libya, 763 conveyed their acceptance of the vaccine, with $X^2=1327.565$ and p-value of 0.00001, there is significant relationship among variables. From the 934 subject who thinks that the vaccine has side-effect, 788 also agreed to be vaccinated. 412 (out of 560 who don't know about the side-effect of the vaccine), and 486 (out of the 506 who are not sure about the side-effect of the vaccine) stated that they will not be taking the vaccine when it is available. With $X^2=992.959$ and p-value of 0.00001, there is significant relationship among variables. Out of the 1025 who are afraid to take the vaccine, 768 accept the vaccine. Among the 465 who are not scared of taking the vaccine, only 157 said that they will receive the vaccine while from the 510 who don't have idea if they fear the vaccine, 479 also conveyed that they don't want to be vaccinated. With $X^2=694.797$ and p-value of 0.00001, there is significant relationship among variables.

Table 4. Cross Tabulation with Intent to Take the Vaccine and Other Determinants (N=2,000)

Variables	Yes	No	All	Chi-Square (X^2)	p-value
Do you think the COVID-19 vaccine prevents the spread of the disease?					
Yes	783	20	803	1429.099	0.00001
No	158	344	502		
I don't Know	15	680	695		

Total	956	1054	2000	<i>Degree of Freedom = 1</i>	
Do you trust the health system of Libya?					
Yes	763	17	780	1327.565	0.00001
No	192	689	881		
I don't Know	1	338	339		
Total	956	1054		<i>Degree of Freedom = 1</i>	
Do you think COVID-19 vaccine has side-effects?					
Yes	788	146	934	992.959	0.000001
No	148	412	560		
I don't Know	20	486	506		
Total	956	1044	2000	<i>Degree of Freedom = 1</i>	
Are you afraid of the side-effects of the vaccines?					
Yes	768	257	1025	694.797	0.00001
No	157	308	465		
I don't Know	31	479	510		
Total	956	1044	2000	<i>Degree of Freedom = 1</i>	

Discussion

Vaccination is known to be one of the, if not the, best public health discovery in this century. Nonetheless, its acceptance or rejection vary with geography, time, social status, ethnicity, and beliefs and tradition.^{17,18,29} Our investigation is the first community-based study under a highly restricted atmosphere. Out of the 2,000 study participants, 1044 (52.2%) said “No” to take the COVID-19 vaccine, and 956 (47.8%) said “Yes” to uptake the COVID-19 vaccine.

In connection with this, being 18-25($X^2=870.206$; p-value= 0.00001), male($X^2=664.153$; p-value= 0.00001), married($X^2=967.552$; p-value= 0.00001), Libyan($X^2=65.443$; p-value= 0.00001), bachelor's degree holder($X^2=728.872$; p-value= 0.00001), government employee($X^2=1007.334$; p-value= 0.00001) were found to be significant predictors in explaining acceptancy of COVID-19 vaccine.

The result of our study is opposing the outcome of previous similar studies that was conducted in China, United States, and Saudi Arabia.^{16,27,28} 64.7% of the study participants in Saudi Arabia expressed their willingness to take

the COVID-19 vaccine.¹⁶ 80% of the study population in the United States reported that they will receive the vaccine for COVID-19.²⁷ 72.5% of the Chinese general population intend to accept COVID-19 vaccine.²⁸ In our study, only 956 out of 2,000 or 47.8% of the subjects conveyed their interest in the uptake of COVID-19 vaccine.

Qualitative comparisons can be done with the same studies for H1N1 Influenza A vaccine where the acceptance rate is between % and 67%.²⁵ United Kingdom showed a 56.1% rate of H1N1 Influenza A vaccine acceptance.³⁰ China and Hong Kong both reported an acceptance rate of 59.5%.^{19,21} The acceptance rate was 64% in the United States.³¹ In previous systematic reviews, there was no consistent association with the respondent's sociodemographic profile, specifically the age and gender.²⁵ On the other hand, our study revealed that age group 18-25, male, married, Libyans with bachelors degree, and government-employed are more likely to take the vaccine than their counterparts.

Perceived risk of being infected is one of the predictors of vaccine acceptance.^{22,25,28} More than half of our study participants, 1025 out of 2,000 or 51.25%, are afraid of the side-effect of the vaccine. Nonetheless, they are more likely to take the COVID-19 vaccine. Studies have shown that a higher trust in the health system is linked with consumption of the health services like vaccination.^{31,32,33} In our study, only 39% (780) trust the health system of the country. 881 (44.05%) don't trust the health care system of the country, and 689 of them don't want to be vaccinated with COVID-19 vaccine. This makes trust in the health system a significant factor of COVID-19 vaccine acceptance (p-value= 0.00001).

Our study has several limitations; firstly, it presents a picture of the community response at one point of the study. Thus, it is cross-sectional. We questioned the group being studied to state their intention to take the COVID-19 vaccine if it is available in the country. A considerable number (52.20%) responded "No". Their answers could be different when vaccine is actually available. Moreover, their intention to take the vaccine could also change over time. Secondly, our study did not explore the reason behind acceptance or the barriers behind the hesitancy of the COVID-19 vaccine. Our questions did not explore the respondent's knowledge of COVID-19, the vaccine's actions and side-effects, their expectations on the vaccine, as well as the reason/s for not trusting the health care system of the country. Even if there are limitations in our study, and even if it was done in a highly strict environment, it is the first of its kind in this area of Libya since the declaration of pandemic in March 2020. It is timely and relevant. Later on, we will explore new research inquiries including vaccine promotion strategies, vaccine safety, vaccine referral and its cost. We will further investigate the key motivation and barriers towards COVID-19 vaccination.

Conclusion and Recommendation

This is the first community-based study that assessed the society's willingness to accept the COVID-19 vaccine with a representative sample even under strict health protocols. The a little over than half of the respondents do not have the intention to take the vaccine as previously presented in the results. Participant's sociodemographic profile (age, gender, marital status, nationality, educational attainment, and occupation,) perceived risk, fear, and trust in the health care system of the country were found to be significant predictors of vaccine acceptance or rejection in Al-Jabal Al-Akhdar District in Libya. The older population, the female group, the single, and the unemployed

counted for higher ratio of the COVID-19 vaccine hesitancy. Most of the respondents who said “no” to the vaccine don’t think that the vaccine can aid in preventing the spread of the disease/virus. Vaccine hesitancy is also parallel to the high number who doesn’t trust the health system of the country. It is noted that there is higher number of respondents who are afraid to take the vaccine. Health education targeting various sociodemographic clusters should be prioritized to intensify vaccine uptake in the country, and elsewhere. Moreover, advertising the benefits of the vaccine outweighing the risk for taking it must be conveyed continuously to alleviate fear. The health care system, in collaboration with the government, should also gain public trust through their efficient and safe performance of duty. Further study should be made in order to verify our findings and to implement health promotion and interventions accordingly.

Declarations

Source of Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Competing Interests Statement

The authors declare no competing financial, professional and personal interests.

Consent for publication

We declare that we consented for the publication of this research work.

Ethical Approval

Ethical approval was obtained from the ethical review committee of Faculty of Nursing, Omar Al-Mukhtar University and supportive letters were obtained as well.

Availability of data and material

Authors are willing to share data and material according to the relevant needs.

References

1. Taylor A., Wuhan: the Chinese mega-city at the center of coronavirus outbreak, The Washington Post, 2020, <https://www.washingtonpost.com/world/2020/1/23/wuhan-chinese-mega-city-center-coronavirus-outbreak/>.
2. Chakraborty C., Sharma A.R., Sharma, G., Bhattacharya M., Lee S.S., SARS-CoV2 causing pneumonia-associated respiratory disorder (COVID-19): diagnostic and proposed therapeutic options, Eur Rev Med Pharmacol Sci., 2020, 24(7): 4016-4026.
3. Saha R.P., Sharma A.R., Singh M.K., et al., Repurposing drugs, ongoing vaccine, and new therapeutic development initiatives against COVID-19, Front Pharmacol., 2020, 11. doi: 10.3389/fphar.2020.01258.
4. Chakraborty C., Sharma A. R., Sharma, G., Bhattacharya M., Lee S. S., The 2019 novel coronavirus disease (COVID-19) pandemic: zoonotic prospective, Asian Pac. J. Trop. Med., 2020, 13(6): 242.

5. COVID-19 Public Health Emergency of International Concern (PHEIC) Global res. and innov. Forum, 2020. ([https://www.who.int/publications/m/item/COVID-19-public-health-emergency-of-international-concern-\(pheic\)-global-research-and-innovation-forum](https://www.who.int/publications/m/item/COVID-19-public-health-emergency-of-international-concern-(pheic)-global-research-and-innovation-forum), accessed 24 April 2020).
6. Ducharme J. World Health Organization Declares COVID-19 a ‘Pandemic.’ Here’s What That Means. Time, 2020 (<https://time.com/5791661/who-coronavirus-pandemic-declaration/> accessed, 24 April 2020).
7. COVID-19 news archive: May 2021, New Scientist, 2021, (<https://www.newscientist.com/article/2278697-COVID-19-news-archive-may-2021/#ixzz75UVsGKCH>).
8. Health Sector Bulletin, Libya February 2021, (<https://www.who.int/health-cluster/countries/libya/Libya-HS-Bulletin-Feb-2021.pdf?ua=1>)
9. Immunization: vaccines are the world’s safest method to protect children from life threatening diseases, 2021, (<https://www.unicef.org/immunization>) accessed May 15, 2021.
10. Moore S., Importance of Global COVID-19 Vaccination. 2021, (<https://www.news-medical.net/health/The-Importance-of-Global-COVID-19-Vaccination.aspx>) accessed May 15, 2021.
11. Vaccine Overview. COVID-19 Real-time Learning Network. CDC and IDSA, 2021, (www.idsociety.org/COVID-19-real-time-learning-network/vaccines/vaccines-overview/) accessed May 15, 2021.
12. There are four types of COVID-19 vaccines: and here’s how they work, Gavi the Vaccine Alliance, 2021, www.gavi.org/vaccineswork/there-are-four-types-COVID-19-vaccines-heres-how-theywork?gclid=Cj0KCQjw4v2EBhCtARIsACan3nxBbGiq5LB9Wf5_2RleBNQ63hTzISIm73cAS5ZXSSbwuB9y0fKVSK0aAq2yEALw_wcB
13. WHO: COVID-19 tracker and landscape, 2021, (<https://www.who.int/publications/m/item/draft-landscape-of-COVID-19-candidate-vaccines>) accessed May 20, 2021.
14. Coronavirus disease (COVID-19): Herd immunity, lockdowns and Covid-19, WHO, (https://www.who.int/news-room/q-a-detail/herd-immunity-lockdowns-and-COVID19?gclid=CjwKCAjwv_iEBhASEiwARoemvOYYp_njxSySwxqTeagiQZ2A5gokp1Bntw7L4RUUsXGimpT4goQdIpRoCqGkQAvD_BwE#) accessed July 1, 2021.
15. Felter C., A guide to global COVID-19 vaccine efforts, Council on Foreign Relations, 2021, (www.cfr.org/background/guide-global-COVID-19-vaccine-efforts) accessed July 1, 2021.
16. Al-Mohaitef M., Padhi B.K., Determinants of COVID-19 vaccine acceptance in Saudi Arabia: a web-based national survey, Journal of Multidisciplinary Healthcare, 2020, 13: 1657-1663 accessed April 1, 2021.
17. Larson H.J., Clarke R.M., Jarrett C. et al., Measuring trust in vaccination: a systematic review, Hum Vaccine Immunother, 2018, 14(7): 1599-1609. doi: 10.1080/21645515.2018.1459252.
18. Xiao X., Wong R.M., Vaccine hesitancy and perceived behavioral control: a meta-analysis, Vaccine, 2020, 38 (33): 5131-5138. doi: 10.1016/j.vaccine.2020.04.076.
19. Chan EYY, Cheng CKY, Tam GCH, Huang Z, Lee PY., Willingness of future A/H7N9 influenza vaccine uptake: a cross-sectional study of Hong-Kong community, Vaccine, 2015, 33(38): 4737-4740.

20. Abbas KM, Kang GJ, Chen D, Were SR, Marathe A. Demographics, perceptions, and socioeconomic factors affecting influenza vaccination among adults in the United States, *Peerj.*, 2018, 6: e5171. doi: 10.7717/peerj.5171.
21. Wu S, Su J, Yang P., et al., Willingness to accept a future influenza A(H7N9) vaccine in Beijing, China, *Vaccine*, 2018, 36(4): 491-497. doi: 10.1016/j.vaccine.2017.12.008.
22. Setbon M, Raude J., Factors in vaccination intention against the pandemic influenza A/H1N1, *Eur J Public Health*, 2010, 20(5): 490-494. doi: 10.1093/eurpub/ckq054.
23. Halpin c, Reid B., Attitudes and beliefs of healthcare workers about influenza vaccination, *Nurs Older People*, 2019, 31(2): 32-39. doi: 10.7748/nop.2019.e1154.
24. Alsuaidi AR, et al., Vaccine hesitancy and its determinants among Arab parents: a cross-sectional survey in the United Arab Emirates, *Hum Vaccine Immunother.*, 2020, 1-7. doi: 10.1080/21645515.2020.1753439.
25. Wilson K, Nguyen HH, Brehaut H., Acceptance of pandemic influenza vaccine: a systematic review of survey of the general public, *Infect Drug Resist.*, 2011, 4: 197. doi:10.2147/IDR.S23174.
26. Habersaat KB, Jackson C., Understanding vaccine acceptance and demand- and ways to increase them, 2020, 63(1): 32-39. doi: 10.1007/s00103-019-03063-0.
27. Thustrom L, et al., Hesitancy towards a COVID-19 vaccine and prospects for Herd immunity, 2020.
28. Fu C, Wei Z, Pei S, Li S, Sun X, Liu P., Acceptance and preference for COVID-19 vaccination in health-care workers (HCWs), *medRxiv*, 2020. doi: 10.1101/2020.04.09.20060103.
29. Cooper S, Schmidt B, Sambala EZ, et al., Factors that influence parents' and informal caregiver's acceptance of routine childhood vaccination: a qualitative evidence synthesis, *Cochrane Database Syst Rev.*, 2019, (2).
30. Rubin G, Potts H, Michie S. The impact of communications about swine flu (influenza A H1N1) on public responses to the outbreak results from 36 national telephone surveys in the UK, *Health Technol. Assess (Rockv)*, 2010, 14(34). doi: 10.3310/htal4340-03.
31. Musa D, Schulz R, Harris R, Silverman M, Thomas SB., Trust in the health care system and the use of preventive health care services by older Black and White adults, *Am. J. Public Health*, 2009, 99(7): 1293-1299.
32. Quinn SC, et al., Measuring vaccine hesitancy, confidence, trust, and flu vaccine uptake: result of a national survey of White and African American adults, *Vaccine*, 2019, 37(9): 1168-1173.
33. Harris KM, Maurer J, Kellermann AL., Influenza vaccine-safe, effective, and mistrusted, *N Eng J Med.*, 2010, 363(23): 2183-2185. doi:10.1056/NEJMp1012333.