Risk Perception and Sociodemographic correlates of acceptance of COVID-19 vaccination among Nurses in Selected Hospitals in the United Arab Emirates

Yang Lin: RN MSN[1], Rose Ekama Ilesanmi. RN, PhD[2], Eman Abdelaziz Rashad Dabou. RN, PhD[3]

[1]RAK Medical and Health Sciences University, UAE.
Email: 1023679088@qq.com
[2]Assistant Professor, RAK Medical and Health Sciences University, UAE.
Email. rose@rakmhsu.ac.ae
ORCID ID: 0000-0003-4101-564X
[3]Lecturer, Medical-Surgical Nursing department, Faculty of Nursing, Alexandria University, Egypt, Assistant professor, College of Nursing, RAK Medical and Health Sciences University, Ras Al Khaimah, United Arab Emirates.
Email: eman.abdelaziz@rakmhsu.ac.ae
ORCID ID: 0000-0002-2105-5073
*Corresponding Author: - Dr. Rose Ekama Ilesanmi
*RAK Medical and Health Sciences University, Ras Alkhaima, Email: rose@rakmhsu.ac.ae
Phone: +9710544714227

Abstract

Background: Vaccination acceptance or resistance is associated with many factors, including, sociodemographic context, perception of personal risk, past experiences with vaccines, and moral convictions. This study examined the risk perception of nurses based on the theory of planned behavior and the sociodemographic correlates of vaccination acceptance in selected hospitals in the United Arab Emirates. Materials and Methods: This was a cross-sectional survey of 139 nurses using convenience sampling method. Data was collected using a structured validated questionnaire with a reliability coefficient: Cronbach α=0.7. Results. The mean age of respondents was 35.9±6.66, majority (85.6%) were married, of which 76.3 had children. On risk perception, 83.1% had close contact (within 1M) with infected patients, and 74.8% had performed aerosol-generating procedures (AGPs). However, only 36.7% were worried about possible infection with COVID-19. Also, 87% readily accepted vaccination when it became available. On demographic correlates, 80.7% of those married, 80.2% of those with children and 85% of those between ages 45-54 ultimately accepted vaccination. However, there was no statistically significant association between demographic characteristics and acceptance of COVID Vaccination (P>0.05). Conclusion: From the findings, we conclude that sociodemographic characteristics determine the acceptance of vaccination among nurses.

Keywords: Risk Perception, sociodemographic factors, Sars-CoV-2 vaccines, United Arab Emirates

1. Introduction/Background

The COVID -19 pandemic was a significant threat to global public health, as the WHO announced in February 2021 that over 108 million people in 219 countries and territories were affected, and about 108M deaths were already recorded (WHO, 2021). "As of November 12, 2022, coronavirus COVID-19 affected 228 countries and territories, with more than 640 million confirmed cases and 6.614 million cumulative deaths" (https://www.worldometers.info/coronavirus/). However, there was a remarkable achievement in the control of COVID-19 control through the development of potent vaccines within a short time. WHO reported that at least seven distinct COVID-19 vaccines were being used in various countries by the middle of February 2021 and that over 200 other vaccines were being developed, including more than 60 in clinical outcome trials (WHO, 2021; AL-Mohaithef et al 2021). There has been active advocacy for increased acceptance and uptake of vaccines. Currently, in the United Arab Emirates, eight vaccines were approved for use as of November 10, 2022 (https://covid19.trackvaccines.org/country/united-arab-emirates/). While the availability of a vaccination program may determine its success, acceptance of the program is equally important, and this is influenced by individual perceptions of threat, trust in the healthcare system, the safety and

doi.org/10.31838/hiv23.01.186 Received: 05.09.22, Revised: 02.10.22, Accepted: 04.11.22

effectiveness of the vaccines, and population demand for the vaccine (AL-Mohaithef et al., 2021; Yupari-Azabache, 2022). Despite the abundance of COVID-19 vaccinations on the market, there have been reports of public resistance and skepticism in various nations. For instance, the United States, one of the nations with the most resources to acquire herd immunity, was badly impacted by new COVID-19 infection waves because more than 40% of its population did not receive vaccination (Wang, Liu 2021; Yupari-Azabache, 2022).

"Vaccine hesitancy is linked to a plethora of factors, including a combination of sociodemographic factors: perception of personal risk, awareness, cost factors, and mode of administration" (MacDonald, 2015). In a more recent report, Enitan et al. (2020) explained that certain scientifically unfounded claims, like the implanting of microchips, the possibility of mutation, racism, and foreign attack, were spread and amplified through online social networks, which decreased the willingness among different groups to receive vaccinations. According to Wang et al.'s (2022) research on a comprehensive assessment of the acceptance and uptake of COVID vaccinations, the global acceptance and uptake rate of the COVID-19 immunization is, respectively, 67.8% (95% CI: 67.1-68.6) and 42.3% (95% CI: 38.2-46.5). The lowest acceptance rates, according to the authors, were discovered in Russia, Ghana, Jordan, Lebanon, and Syria. Black people, those with poor socioeconomic status, and expectant or nursing mothers were vulnerable groups with low acceptance rates.

The universal effectiveness of SARS-CoV-2 vaccinations in lowering fatalities, symptomatic cases, severe cases, and infections has been reassuringly demonstrated (Liu et al., 2021; Shui et al., 2022), leading to an improvement in recovery rates.

Data from the World Corona Virus Tracker indicated that as of November 12, 2022, "the United Arab Emirates had administered over 24 million COVID vaccines. This report further states that assuming every person needs two doses, the number of doses already administered suggests that about 127.5% of the UAE's population is already vaccinated". (https://graphics.reuters.com/world-coronavirus-tracker-and-maps/countries-and-territories/united-arab-emirates/). Over 70% of the population is currently fully immunized in the UAE, which is one of the leaders in the world for immunizing "medically eligible" residents against COVID-19 in the effort to build herd immunity (Suliman, et al 2021).

The population of the seven emirates that make up the UAE, which have a combined population of 10,022 million (2021), is around 88.52% foreign-born, including the nursing workforce. Regarding vaccine adoption, other studies have been carried out in other emirates, such as Abu Dhabi and Dubai. The goal of the current study was to determine the sociodemographic factors influencing nurses' acceptability of the COVID-19 immunization, the current study was carried out in 2021. To the best of our knowledge, this is the first study on nurses' adoption of the COVID-19 vaccine in the Emirate of Ras Alkhaima.

2. Methods

Design: The study was a cross-sectional survey of nurses in three selected hospitals in one of the emirates in the UAE.

Sample size: In all, 384 registered nurses in the selected hospitals fulfilled the inclusion criteria of providing direct care to patients in the selected hospitals. The minimal sample size was determined using the online sample size calculator (Raosoft, Inc., 2004). 309 nurses made up the generated sample, which had a margin of error of 5%, a response distribution of 50%, and a 95% confidence level. Respondents were selected using a convenience sample selection.

Inclusion/Exclusion criteria: All nurses providing direct care to patients were selected. However, nurses who worked in the hospital administration were excluded from participation.

Instrumentation: A structured questionnaire developed from the literature review was used for data collection and comprised of 13 items to measure nurses' risk perception to COVID -19 on a 3-point response scale 'Yes,' 'Not Sure,' and 'No'. Finally, nurses' acceptance of COVID-19 vaccination was examined using seven (7) items and measured on a 5-point Likert scale.

The researchers performed test-retest reliability and Cronbach α=0.7 suggesting that the items were reliable. Regarding the validity of the instrument, a panel of experts evaluated the instrument for relevance, clarity, and completeness. A score of >0.74 on a 4-point Likert scale, which was used to score each item, was deemed legitimate. (All things fell between 0.77 and 1). I-CVI stood at 0.77. Items were reworded in accordance with the experts' suggestions. As an illustration, one question on risk perception of exposure was changed to read "have you already had seasonal influenza vaccine" as indicated. Calculated values for the Item-Content Validity Index (I-CVI) and Kappa statistics are =0.769. (Kappa scores >0.74 Excellent, 0.60 -0.74 Good, and 0.40-0.59 Fair).

The total score on the 5-point Likert scale = is 35. The range of scores was categorized as follows: Completely agreed (24-35), Neutral (12-23), and completely disagree (1-11).

3. Results

Ethical approval was obtained from the institutional boards (MOHAP/REC2021/21-2021PG-1). Each prospective respondent could access the instrument using a link from their email after signing the consent form. After that, those who accepted to participate provided their consent and completed the online survey questionnaire via google forms.

Data Analysis: Only 139 questionnaires had been received at the conclusion of data collection. In order to screen, code, and analyze the data, SPSS version 21.0 was used. The following two hypotheses were investigated: I the relationship between the participants' chosen demographic variables and their acceptance of the COVID-19 vaccination; and (ii) the relationship between nurses' risk perception and vaccination acceptance.

Sociodemographic characteristics: From table 1, The majority of nurses were between the ages of 24 and 34 (49.6%), mean= 35.9±6.66. About 85.6 % were married, and 76.3% had children. The majority (87.1%) were staff nurses, of which 84.9% were working 12-hour shifts per day.

Table 1. Sociodemographic characteristics of the nurses (N=139)

Nurses' demographic data	Frequency (N=139)	Percent 100%
Age		
24-34	69	49.6
35-44	54	38.8
45-54	14	10.1
50-60	2	1.4
	Mean:35.9±6.66	
Gender		
Male	11	7.9
Female	128	92.1
Marital Status		
Married	119	85.6
Single	20	14.4
Having children?		
Yes	106	76.3
No	33	23.7
Designation		
Staff Nurse	121	87.1
Nurse in Charge	13	9.4
Supervisor	5	3.6
Number of working hours per day		
8 hrs	21	15.1
12 hrs	118	84.9

Nurses' risk Perception of COVID-19 infection: Table 2 presents nurses' perception of risk of exposure to COVID-19 infection. From the table, 79.9% have cared for confirmed COVID-19 patients, and 81.3% have had a face-to-face contact (within 1 meter) with a verified COVID-19 patient in a health care facility. Only 51 (36%) were worried that they could be infected. On engaging with aerosol-generating procedures (AGPs), 74.8% of the nurses were present when AGPs were performed on a patient. Regarding the types of AGP, findings show that nebulizer treatment was the most used APG by nurses (59%), followed by open airway suctioning (39.6%) tracheal intubation (36.7%), respectively.

Table 2. Nurses' Risk Perception to COVID-19 Infection (n=139)

Item	Yes Freq. (%)	Not Sure Freq. (%)	No Freq. (%)
Have you ever received any seasonal influenza vaccine previously?	50 (36.0)	76(11.5)	73 (52.5)
Have you ever cared for a confirmed COVID-19 patient?	111(79.9)	4 (2.9)	24 (17.3)
Are you worried that you could be infected with the COVID-19 virus?	51(36.7)	13 (9.4)	75(54.0)
Have you ever had a face-to-face contact (within 1 meter) with a confirmed COVID-19 patient in a health care facility?	113(81.3)	12 (8.6)	14 (10.1)
Were you present when any aerosol-generating procedures (AGP) was performed on a patient?	104(74.8)	7 (5.0)	28(20.1)
If Yes, what type of AGP?			
Tracheal intubation	51(36.7)	0 (0)	88 (63.3)
Nebulizer treatment	82 (59.0)	0 (0)	57 (41.0)
Open airway suctioning	55 (39.6)	0 (0)	84 (60.4)
Collection of sputum	44 (31.7)	0 (0)	95 (68.3)
Tracheostomy	34 (24.5)	0 (0)	105(75.5)
Bronchoscopy	5 (3.6)	0 (0)	134(96.4)
Cardiopulmonary resuscitation (CPR)	47 (33.8)	0 (0)	92 (66.2)
Other, (specify)	14 (10.0)	0 (0)	125(89.9)

Nurses' acceptance of COVID-19 vaccination: The nurses' acceptance of the COVID-19 immunization is shown in Table 3. In the table, 87% of respondents selected "absolutely agree" for the statement "I immediately embraced the COVID-19 infection vaccine when it became available." Additionally, 94.2% of respondents said

they would strongly advise their family members to receive the COVID-19 immunization. Table 4's total score reveals that 81.3% of respondents said they were prepared for vaccination.

Table 3. Acceptance of COVID-19 vaccination			
	Completely agree Freq. (%)	Neutral Freq. (%)	Completely disagree Freq. (%)
I readily accepted Vaccination for COVID-19 infection when it became available	121 (87)	13 (9.4)	5 (3.6)
I readily recommended COVID vaccination to my family members.	131 (94.2)	6 (4.3)	2 (1.5)
I will accept vaccination if further studies indicate its effectiveness.	114 (82)	23 (16.5)	2 (1.5)
I will accept the COVID-19 vaccine depending on the specific brand that is available.	99 (71.2)	32 (23.0)	8 (5.8)
I accept COVID-19 vaccination only because I am exposed to and in contact with infected cases.	54 (38.8)	30 (21.6)	55 (39.6)
I am reluctant to accept the COVID-19 vaccine because of my medical condition.	45 (32.4)	43 (30.9)	51 (36.7)
I am ready to be vaccinated to protect my family.	98 (70.5)	23 (16.5)	18 (13)

Table 4: Cumulative Score on acceptance of COVID -19 vaccine			
	Score Range	Frequency	Percentage
Completely Agree	24-35	113	81.3
Neutral	12-23	26	18.7
Completely disagree	1-11	0	0.0
Total		139	100

Association of Risk perception with acceptance of vaccination. There was no significant association of risk perception with acceptance of vaccination, therefore we fail to reject the null hypothesis.

Table 5. Nurses' Risk perception with acceptance of Vaccination				
Perception of the level of risk	Vaccination acceptance			
	Completely Agree	Neutral	Chi-square	P-Value
Have you ever received the seasonal vaccine YES Not Sure NO	43 (86.5%) 1 (6.3%) 18 (24.7%)	7 (1.4%) 15 (93.8%) 55 (75.3%)	0.169	0.523
Have you ever cared for a confirmed COVID- 19 patient? YES Not Sure NO	90 (81.1%) 3(75.0%) 20 (83.3%)	21 (18.9%) 1 (25.0%) 4(16.7%)	0.913	0.567
Are you worried that you could be infected with COVID 19 virus? YES Not Sure NO	44 (86.3%) 11(84.6%) 58 (77.3%)	7 (13.7%) 2(15.4%) 17 (22.7%)	0.430	0.279
Have you ever come into close proximity (within one meter) to a confirmed COVID-19 patient while you were inside a medical facility? YES Not Sure NO	93 (82.3%) 9(75.0%) 11(78.6%)	20 (17.7%) 3(25%) 3 (21.4%)	0.725	0.298
Were you present when any aerosol-generating procedures (AGP) were performed on a patient? YES Not Sure NO	84 (80.8%) 7(100%) 22(78.6%)	20(19.2%) 0(0.0%) 6(21.4%	0.505	0.305

Association between sociodemographic characteristics with acceptance of vaccination. We are unable to reject the null hypothesis because table 6 shows no significant correlation between the sociodemographic factors and the degree of COVID-19 vaccination.

Table 6: Association between the Sociodemographic and the acceptance of COVID-19 vaccination:			
Sociodemographic	acceptance of COVID Vaccination		Test (sig.)
	Completely Agree	No Opinion	
Age			FET= .841 P= .818
24-34	54 (78.3 %)	15 (21.7 %)	
35-44	45 (83.3 %)	9 (16.7 %)	
45-54	12 (85.7 %)	2 (14.3 %)	
50-60	2 (100 %)	0 (0.0 %)	
Gender			χ^2 = .002 P= 1.00
Male	9 (81.8 %)	2 (18.2 %)	
Female	104 (81.3 %)	24 (18.8 %)	
Marital Status			χ^2 = .211 P= .76
Married	96 (80.7 %)	23 (19.3 %)	
Single	17 (85.0 %)	3 (15.0 %)	
Having children?			χ^2 = .359 P= .62
Yes	85 (80.2 %)	21 (19.8 %)	
No	28 (84.8 %)	5 (15.2 %)	
Designation			FET = 1.04 P= .58
Staff Nurse	97 (80.2 %)	24 (19.8 %)	
Nurse in Charge	12 (92.3 %)	1 (7.7 %)	
Supervisor	4 (80.0%)	1 (20.0 %)	
Number of working hours per day			χ^2 = .318 P= .76
8 hours	18 (85.7 %)	3 (14.3 %)	
12 hours	95 (80.5 %)	23 (19.5 %)	
FET = The Fisher's Exact Test	Significant difference at P level ≤ 0.05		

4. Discussion

Age, marital status, gender, educational attainment, and attitudes toward vaccine-related concerns are among the demographic variables that affect public acceptance of vaccines (Samo et al., 2022). Several studies have reported variability in vaccine acceptance across different countries (Lin et al, 2020; Taylor et al, 2020; Detoc et al, 2020). In this study, there were more female respondents (92.1%) than male respondents (7.9%). Given that there are often more women than men in the nursing profession—men make up only 14.5% of nurses in the USA, 6.2% in Singapore, and 8.2% in the UK, respectively—this is to be expected (Mao 2021, World bank 2020).

Furthermore, the majority (54%) were between ages 34-44years of age, 84% were married and 76% also had children. Our findings show that 80.7% of those who were married completely accepted to be vaccinated. One logical explanation to this finding is that 70.5% believed that being vaccinated would protect their families from being infected. Also, 80.2% of those who had children accepted to be vaccinated, which may be considered an indirect measure to protect their children from becoming infected. Similar results were noted by Nusair et al. (2022) in a research on Jordan's adoption of the COVID-19 vaccine and risk perception.

According to the authors, a higher vaccine acceptance rate was found among participants with children. In our study, we found no statistically significant association between marital status and having children with the acceptance of COVID-19 vaccination. We also found that 85% of older nurses (ages 45-54) ultimately accepted vaccination, while only 14.3% were undecided. Samo et al. (2022) indicated that a higher rate of acceptance of the COVID-19 immunization was identified among younger people under 30 years of age. This finding conflicts with their findings.

The majority of the respondents (87%) readily accepted vaccines when they became available and 92.8% of the nurses recommended COVID-19 vaccination to patients. These results are in line with the conclusions of a thorough investigation of the opinions of healthcare professionals from six Asian nations: China, India, Indonesia, Singapore, Vietnam, and Bhutan; (Chew et al., 2021). More than 95% (n=1728) of healthcare professionals, according to the authors, were willing to get immunized. According to the authors, the responders may have thought the epidemic was serious and that the vaccination was safe and less stigmatized. According to the WHO (2020) , herd immunity is directly proportional to the rate of vaccination, which would largely be influenced by the perception and acceptance level of the population. Literature demonstrates that healthcare providers in various nations have very different mindsets. For instance, a 2020 survey of 13, 426 people in 19 countries about the likely acceptance of the COVID-19 vaccine revealed a wide range of replies (Chew et al., 2021).

The Theory of Planned Behavior served as the basis for the current study (TPB). As a result, a person's decision to get vaccinated would depend on their perception of risk, susceptibility to infection, and how serious they believed the COVID-19 pandemic to be. We contend that nurses in the current study believed they were vulnerable to the disease and at risk. Additionally, nurses' acceptance of vaccination might have been influenced by their perception of danger. Only 32.4% of people were hesitant to accept the COVID-19 vaccine at the time of data collection.

We looked at the relationship between nurses' perceptions of their level of risk and their willingness to get immunized. The results of the chi-square test revealed no statistically significant connection ($P>0.05$), suggesting that nurses' perception of their risk level influenced their acceptance of vaccination. These results tend to align with the assumptions of the TPB, which propose that subjective norms, including individual perceptions and beliefs, drive behavioral intention. We, therefore, infer that nurses in this study perceived themselves as at high risk for infection; thus, they were motivated to get vaccinated. Our findings also indicated that 93.5 % of nurses were already vaccinated at the time of data collection. Similarly, in Chew et al. (2021) study regarding healthcare workers' perception and willingness to accept vaccination, over 95% (N=1720) were willing to be vaccinated based on their perception of the severity COVID-19 pandemic.

5. Strength and Limitation

The design of the study was appropriate for the study objectives. The questionnaire was well-designed and an appropriate statistical package was used, which showed the expected results, thereby providing the desired outcome of the research. On the limitations, findings from the study cannot be generalized because the study was delimited to only three hospitals in Ras Al Khaimah, and the response rate was 44.9% out of the calculated sample size of 309.

6. Conclusion

The goal of the current study was to evaluate the sociodemographic factors that influence nurses' acceptance of the COVID-19 immunization. Findings indicated that most of the participants accepted vaccination for COVID-19 when it became available and also that sociodemographic characteristics can influence vaccination uptake among nurses.

The authors have stated that they have no conflicts of interest.

Funding source: None

Authors' acknowledgment: We acknowledge the support of the nurse managers in the three hospitals, and the nurses who participated in the study.

References

Al-Mohaithef, M., Padhi, B. K., & Ennaceur, S. (2021). Socio-demographics correlate of COVID-19 vaccine hesitancy during the second wave of COVID-19 pandemic: a cross-sectional web-based survey in Saudi Arabia. Frontiers in Public Health, 794. https://doi.org/10.3389/fpubh.2021.698106.

Chew, N. W., Cheong, C., Kong, G., Phua, K., Ngiam, J. N., Tan, B. Y., ... & Sharma, V. K. (2021). An Asia-Pacific study on healthcare workers' perceptions of, and willingness to receive, the COVID-19 vaccination. International Journal of Infectious Diseases, 106, 52-60. https://doi.org/10.1016/j.ijid.2021.03.069.

COVID Live—Coronavirus Statistics—Worldometer. (cited Nov 8, 2022]. Available: https://www.worldometers.info/coronavirus.

Detoc, M., Bruel, S., Frappe, P., Tardy, B., Botelho-Nevers, E., & Gagneux-Brunon, A. (2020). Intention to participate in a COVID-19 vaccine clinical trial and to get vaccinated against COVID-19 in France during the pandemic. Vaccine, 38(45), 7002-7006. https://doi.org/10.1016/j.vaccine.2020.09.041

Enitan, S. S., Oyekale, A. O., Akele, R. Y., Olawuyi, K. A., Olabisi, E. O., Nwankiti, A. J., & Enitan, C. B. (2020). Assessment of knowledge, perception and readiness of Nigerians to participate in the COVID-19 vaccine trial. International Journal of Vaccines and Immunization, 4(1), 1-13. dx.doi.org/10.16966/2470-9948.123.

Lin, Y., Hu, Z., Zhao, Q., Alias, H., Danaee, M., & Wong, L. P. (2020). Understanding COVID-19 vaccine demand and hesitancy: A nationwide online survey in China. PLoS neglected tropical diseases, 14(12), e0008961. https://doi.org/10.1371/journal.pntd.0008961

Liu, Q., Qin, C., Liu, M., & Liu, J. (2021). Effectiveness and safety of SARS-CoV-2 vaccine in real-world studies: a systematic review and meta-analysis. Infectious diseases of poverty, 10:123, 1-15. https://doi.org/10.1186/s40249-021-00915-3.

MacDonald, N. E. (2015). Vaccine hesitancy: Definition, scope and determinants. Vaccine, 33(34), 4161-4164. https://doi.org/10.1016/j.vaccine.2015.04.036.

Nusair, M. B., Arabyat, R., Khasawneh, R., Al-Azzam, S., Nusir, A. T., & Alhayek, M. Y. (2022). Assessment of the relationship between COVID-19 risk perception and vaccine acceptance: a cross-sectional study in Jordan. Human Vaccines & Immunotherapeutics, 18(1), 2017734. https://doi.org/10.1080/21645515.2021.2017734

Raosoft, Sample Size Calculator, Inc. (2004). [Internet]. [Cited 2020 August 2]. Available from: http://www.raosoft.com/samplesize.html.

Samo, A. A., Sayed, R. B., Valecha, J., Baig, N. M., & Laghari, Z. A. (2022). Demographic factors associated with acceptance, hesitancy, and refusal of COVID-19 vaccine among residents of Sukkur during lockdown: A cross sectional study from Pakistan. Human Vaccines & Immunotherapeutics, 18(1), 2026137. https://doi.org/10.1080/21645515.2022.2026137

Shui, X., Wang, F., Li, L., & Liang, Q. (2022). COVID-19 vaccine acceptance among healthcare workers in China: A systematic review and meta-analysis. Plos one, 17(8), e0273112. https://doi.org/10.1371/journal.pone.0273112.

Suliman, D. M., Nawaz, F. A., Mohanan, P., Modber, M. A. K. A., Musa, M. K., Musa, M. B., ... & Moonesar, I. A. (2021). UAE efforts in promoting COVID-19 vaccination and building vaccine confidence. Vaccine, 39(43), 6341-6345. https://doi.org/10.1016/j.vaccine.2021.09.015.

Taylor, S., Landry, C. A., Paluszek, M. M., Groenewoud, R., Rachor, G. S., & Asmundson, G. J. (2020). A proactive approach for managing COVID-19: the importance of understanding the motivational roots of vaccination hesitancy for SARS-CoV2. Frontiers in psychology, 11, 575950. https://doi.org/10.3389/fpsyg.2020.575950.

The World Bank. Nurses and midwives (per 1,000 people), 2020, https://data.worldbank.org/indicator/SH.MED.NUMW.P3. Accessed July 1 2020.

Wang, Q., Hu, S., Du, F., Zang, S., Xing, Y., Qu, Z., ... & Hou, Z. (2022). Mapping global acceptance and uptake of COVID-19 vaccination: A systematic review and meta-analysis. Communications Medicine, 2(1), 1-10. https://doi.org/10.1038/s43856-022-00177-6

Wang, Y., & Liu, Y. (2021). Multilevel determinants of COVID-19 vaccination hesitancy in the United States: A rapid systematic review. Preventive medicine reports, 25:101673. https://doi.org/10.1016/j.pmedr.2021.101673.

Yupari-Azabache, I. L., Díaz-Ortega, J. L., Bardales-Aguirre, L. B., Barros-Sevillano, S., & Paredes-Díaz, S. E. (2022). Factors Associated with the Acceptance of COVID-19 Vaccines in Citizens of Northern Peru: Cross-Sectional Study. Risk Management and Healthcare Policy, 15, 1705-1715. https://doi.org/10.2147/RMHP.S374385.