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Perceptions and Attitudes about COVID-19 Vaccines Regarding Vaccine Intention and Hesitancy of Attendants of a Healthcare Center in Northern Cyprus

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Abstract

Background and aim: Vaccination is considered the most effective method of providing immunity in the community for controlling morbidity and mortality due to infectious diseases. A safe and effective vaccine is considered a critical tool for controlling the COVID-19 morbidity and mortality as well. Hence, knowledge of the attitudes and perceptions of vaccination in all countries should be available and recorded by health systems. The aim of this study was to determine the attitudes and perceptions about COVID-19 vaccination regarding the intention and hesitancy of attendants of a healthcare unit in Northern Cyprus, where no previous data among the general population was available at the time of the study.

Methods: This is a cross-sectional epidemiological study of 428 patients and other attendants who applied to the healthcare center in the city of Nicosia, Northern Cyprus. The data collection tool was a questionnaire designed by the researchers, utilizing international documents on COVID-19 vaccinations. The data were analyzed using the SPSS 18.0.0 program. The differences between the groups were evaluated using the chi square test, with the significance level set as $p<0.05$.

Results: Of the total participants, 93.0% were vaccinated against COVID 19 with more one more doses in total, 64.5% with 2 doses and 19.4% with 3 doses. The one–dose rate was significantly higher than the world average of 70%. Of those who were vaccinated, 64.5% had received the Sinovac and 37.6% the Comirnaty vaccine. The majority of the participants believed that vaccines are effective for protecting against infection. Personal protection from the infection was the leading factor for vaccination willingness. Higher education was a predictor of better knowledge of COVID-19 vaccines and also vaccination intention. Among the 16% with vaccine hesitancy, the reasons were identified as speedy authorization of the vaccines by the WHO (40%), adverse effects of the vaccines (22.4%), speedy development of the vaccines (18%), the ineffectiveness of the vaccines for prevention (9.6%), and dislike of vaccines or injections in general (6.1%).

Conclusion: This study has revealed the vaccination intention and hesitancy status and associated factors among the general population in this region of the world, illustrating similar findings to those in the medical literature.

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Keywords: COVID-19 vaccine intention; attitudes and perceptions; COVID-19 vaccine hesitancy; Northern Cyprus; general population.

Introduction and objectives

Vaccination is considered the most effective method of providing immunity in the community for controlling morbidity and mortality due to infectious diseases. Hence, a safe and effective vaccine is a critical tool for controlling the COVID-19 morbidity and mortality.

A total of 13,355,264,024 vaccine doses had been administered globally as of 22 May 2023 according to WHO data[1]. Of the world population, 70% had received at least one dose of a COVID-19 vaccine. According to other international data, while 13.38 billion doses had been administered globally, only 29.9% of people in low-income countries had received at least one dose as of 25 May 2023 [2].

By 2022, of the percentages of people with a complete initial vaccination protocol were 88.95% in China, 88.67% in Cuba, 86.48% in Portugal, 80.96% in Italy, 76.02% in Germany, 75.13% in the United Kingdom, 62.67% in Turkey and 67.18% in the USA. In China, more than one billion doses had been administered and 890 million people had been fully vaccinated by 2022 [3]. On the other hand, vaccination problems persisted in low and low-middle-income countries in particular, as international efforts were far from being successful in this regard [4]. For example, the rates of fully vaccinated people were 56.21% in Pakistan, 35.57% in Egypt, 31.84% in Ethiopia and 11.56% in Nigeria in the same period [3]. According to the data of Cyprus in general, 50.2% of the eligible population were fully vaccinated, and 64.6% had received at least the first dose in 2021 [5].

There are a number of reasons for such differences in vaccination rates. In addition to the obstacles regarding the provision of vaccines in lower income countries, the lack of knowledge about vaccines in the society and vaccine

hesitancy are among the important barriers to sufficient immunization. Therefore, investigating the causes and frequencies of vaccine hesitancy appears to be significant step for understanding these problems [6]. Vaccine hesitancy in a population needs to be monitored by relevant tools and measures, as recommended by the WHO [7].

Vaccine hesitancy was previously defined as the delay in acceptance or refusal of vaccination services despite their availability. This definition was modified in May 2022 by the WHO Behavioral and Social Drivers of Vaccination (BeSD) Working Group and endorsed by the WHO Strategic Advisory Group of Experts(SAGE) on immunization. It is now defined as “a motivational state of being conflicted about, or opposed to, getting vaccinated; including intentions and willingness” [8].

In societies where vaccination services are sufficiently available, the factor that is most influential on vaccination rates is vaccine hesitancy [9][10][11]. Vaccine hesitancy constitutes a prominent barrier to the uptake of the COVID-19 vaccine in high-income countries or regions [10][12].

Vaccine hesitancy rates in high-income countries or regions range from 7 to 77.9%. Younger age, female sex, non-Caucasian ethnicity, and low education were determined to be factors associated with increased vaccination hesitancy. Lack of flu vaccination, low self-perceived risk of contracting or less concern about COVID-19, believing COVID-19 is not serious and having no chronic medical conditions were other factors contributing to hesitancy [12].

Published research and data on vaccine hesitancy from low and middle-income countries are limited[13]. A study conducted in Turkey among the general population found that 41.2% of the participants were willing to have a COVID-19 vaccine, while 37.9% were hesitant. The reasons for hesitancy included concern about adverse effects (75.9%) and mistrust about the manufacturers of the vaccines (34.4%), 64.3% stating a preference for the domestic vaccine [14]. A similar study aimed at determining the COVID-19 vaccination intention among nurses and midwives in Cyprus reported 70.0% vaccine hesitancy [15].

To the best of our knowledge, no previous study has been conducted to establish the COVID-19 vaccine uptake, vaccination intention and vaccine hesitancy in Northern Cyprus among the general population. There are more data available on healthcare professionals than on other groups living throughout the island.

Objective: The current study aims to investigate the vaccine uptake, intention to accept the COVID-19 vaccines and vaccine hesitancy rates in the society of Northern Cyprus and associated factors.

Methods

This study was carried out between 04 and 31 October 2021 at a central healthcare facility in the city of Nicosia, Northern Cyprus.

This is a cross-sectional epidemiological study of patients and other attendants who applied to the healthcare center. Dependent variables were perceptions and attitudes about the COVID-19 vaccination, including intention and acceptance

of the vaccine and vaccine hesitancy. Independent variables included age, gender, nationality, marital status, occupation, educational status, socioeconomic status, having a chronic disease, and knowledge of COVID-19 and COVID-19 vaccines.

Sampling

A non-probability convenience sampling method was used, and people aged 15 years and above who attended the study health center were recruited. A total of 428 patients and their companions participated in the study.

The reason for applying a non-probability sampling method was the fact that this clinic was relatively larger in size compared to others and was providing comprehensive primary healthcare services in the region, addressing a broad variety of the population. The people visiting this clinic included a distribution of all age groups, genders, ethnicities, and nationalities, similar to the population composition of the island. Additionally, it was relatively easier to obtain official permissions at this facility affiliated to the Health Ministry.

Outcome Measurement

The primary outcome of concern of the study was the uptake and intention for uptake of the COVID-19 vaccine and hesitancy rate. The intention or willingness was measured by vaccine uptake, readiness or hesitancy to be vaccinated.

Data collection tool and method

The data collection tool was a questionnaire designed by the researchers, utilizing international documents accessed through a comprehensive literature search and adapting them to national requirements [16][17][18][19]. The first 14 questions are about the socio-demographic characteristics of the participants. The following 13 questions are about the COVID-19 history and vaccination status of the participants. The type of COVID-19 vaccine and the number of doses of the vaccine were inquired in this section. The next section comprises 18 questions about the participants' perceptions and attitudes of COVID-19 vaccination. This section covers questions on vaccine intention, acceptance, concern about vaccines, vaccine hesitancy, and also the sources of information about vaccines. The last 8 questions are on the knowledge of COVID-19 and COVID-19 vaccines. Questionnaires were responded by the participants under observation after obtaining their informed consent.

The pre-test of the study was conducted on 20 patients and their companions attending the Near East University Hospital. The pre-test revealed that the questions were understandable and the time required to complete the questionnaire was about 10 minutes.

Analysis of the Data

Obtained data were analyzed using SPSS 18.0.0 (Statistical Package for the Social Sciences). For the analysis, descriptive statistics (frequency, mean, median, standard deviation, maximum-minimum values) were calculated, marginal

and cross-tabulated. The differences between the groups were evaluated using the chi square test, with the significance level set as $p<0.05$.

Ethics Issues

Participants responded to the questionnaire anonymously. Informed consent was obtained from the participants. Permission to conduct the research was provided by the Ministry of Health. Institutional ethics compliance approval was obtained.

Results

Socio-demographic characteristics of the participants are presented in Table 1.The majority of the participants were citizens of North Cyprus and Turkey. People of younger ages comprised the study group, with 68.9% being under 45 years, and 52.3% of the total sample were women.

Table 1. Socio-demographic characteristics of the participants (Nicosia, October 2021) (N=428)

Socio-demographic characteristic	n	%
Gender		
Female	224	52.3
Male	204	47.7
Age group		
≤24	81	18.9
25-44	214	50.0
45-64	108	25.2
≥65	25	5.9
	Mean ± SD=38.3 ± 14.8	*Median= 36 Min-Max=15-83*
Country of origin		
Northern Cyprus	237	55.4
Turkey	184	43.0
Other countries	7	1.6
Marital status		
Married	225	52.6
Single	193	45.1
Divorced/Widower	10	2.3
Having children		
Yes	227	53.0
No	201	47.0
Educational status		
Primary School and below	68	15.9
Junior high school	51	11.9
High school	132	30.8
University and above	177	41.4
Employment status		
Employed	216	50.5
Unemployed	161	37.6
Retired	51	11.9
Number of household members		
1-2	140	32.7
3-4	222	51.8
≥5	66	15.5
	Mean ± SD=3.2 ± 1.4	*Median= 3 Min-Max=1-8*
Economic status of household		
High	31	7.2
Middle	312	72.9
Low	85	19.9

The participants history of chronic diseases and COVID-19 is presented in Table 2. Of the participants, 12.9% stated that they had recovered from a COVID-19 infection, 82.2% of them knew people who had COVID-19, and 61.4% stated that they knew people who had died of COVID-19. There was no statistically significant difference between participants with chronic disease and the others with regard to acquiring the COVID-19 infection.

Table 2. History of chronic disease and acquired COVID-19 status of the participants (Nicosia, October 2021) (N=428)

Feature	n	%
Participants with chronic disease	86	20.1
Distribution of chronic diseases (n=86)*		
Cardiovascular system	48	55.8
Endocrin system	31	36.0
Respiratory system	24	27.9
Gastrointestinal system	5	5.8
Other	8	9.3
Previous COVID-19 infection status of chronic disease group	11	12.8
Previous COVID-19 infection status of all participants**	55	12.9

** All the row percentages were calculated out of 86*

*** χ^2=0.32, p=0.85*

Table 3. The vaccination status of the participants (Nicosia, October 2021) (N=428)

COVID-19 vaccination status	n	%
At least one dose	398	93.0
Vaccine type		
Sinovac (CoronaVac)	276	64.5
Comirnaty (Pfizer-BioNTech)	161	37.6
Jannsen	22	5.1
AstraZeneca (Vaxzevria)	13	3.0
Moderna	4	0.9
Number of vaccine doses		
1	44	10.3
2	276	64.5
3	83	19.4
4	2	0.5
No difficulty in accessing the vaccines	304	71.0

Table 4. Attitudes and knowledge about COVID-19 and COVID-19 vaccines by educational status (Nicosia, October 2021) (N=428)

	Educational status					
Attitude, perception, knowledge	Junior high school and below		High school and above		χ^2	p
	n	%	n	%		
Would like to learn about vaccines						
	111	93.3	289	93.5	0.72	0.70
COVID-19 vaccine is important to curb the spread of disease						
	102	85.7	275	89.0	0.9	0.64
COVID-19 vaccine is important for community health						
	109	91.6	267	86.4	2.16	0.34
I got the COVID-19 vaccine because it is mandatory						
	63	52.9	118	38.3	12.6	**0.02**
COVID-19 vaccine is unnecessary, since most people will be infected with COVID-19						
	25	21.0	52	16.8	7.3	0.26
Correct knowledge of COVID-19 fatality rate						
	56	47.1	179	57.6	24.1	**0.04**
Correct knowledge of COVID-19 incubation period						
	24	20.2	96	31.1	5.1	**0.02**

Table 3 shows the COVID-19 vaccination status of the participants.

Of the participants 23.5% of those whose education level was junior high school and below and 46.6% of those with education of high school and above stated that they received information about COVID-19 vaccines from social media and the internet. The difference between the groups according to education levels about getting information on vaccines from social media and the internet was found to be statistically significant. More people with higher education received information from social media and the internet.

A total of 93.1% of those aged 40 years and below and 92.9% of the group above 40 years were vaccinated for COVID-19. The difference between the age groups in terms of getting the COVID-19 vaccine was not statistically significant.

The differences between the groups in regard to some categorical variables such as vaccination status according to nationality, sex, and knowledge of COVID-19 vaccines were not statistically significant.

Discussion

In this study, 93.0% of the participants were vaccinated with one or more vaccine doses for COVID-19 in total. The one–dose rate is much higher than the world average of 70% [2]. Of the participants in the study, 81.8% expressed the view

that vaccines are beneficial for protection from the infection.

Our findings are in compliance with a broad survey covering low and middle income countries. A common survey of 15 studies conducted in Africa, South Asia, Latin America, Russia, and the United States (US) in 2020-2021 compared low-income, lower-middle-income countries, and upper-middle-income countries with Russia and the US [4]. Similar to the 93% acceptance and uptake rate in our study, the average acceptance rate in all studies in low and middle income countries was 80.3%, higher than samples from the United States (64.6%) and Russia (30.4%) [4]. Another study from 2020 led by the African Centers for Disease Control and Prevention covering 15 African countries found that the majority of the respondents (79%) were willing to receive a COVID-19 vaccine [13].

In the general population, the lowest rates of vaccine confidence were found in Hong Kong (4.2-38%), the Middle East (Jordan & Kuwait, 29.4% & 36.8%, respectively) followed by the Democratic Republic of Congo (15.4%) in a systematic review of 2021 [19]. On the other hand, the highest acceptance rates were found in Malaysia (94.3%), Indonesia (93.3%), and China (91.9%). In the Eastern Mediterranean Region, confidence rates in the general population varied from 29.4% to 64.7% [18]. In a study conducted in Southern Ethiopia, the willingness of the participants to be vaccinated was found to be low (46.1%) [20]. These data support the definition of vaccine hesitancy of theSAGE on Immunization as being “complex and context specific, varying across time, place and vaccines”.

Our findings revealed that 79.6% of the respondents expressed the reason for being vaccinated as being protected personally from the infection, followed by protection of family members (79.1%). Data from other surveys indicated similar results in that vaccine acceptance and uptake are primarily motivated by the need for protection against COVID-19. Higher vaccine acceptance was associated with socio-demographic factors such as high income, male gender, older age, being married, having older children with vaccine coverage, not having any chronic illnesses, higher education and health insurance coverage. Suspicion about safety/potential vaccine harms, efficacy, rushed development of vaccines, and cost-effectiveness of the COVID-19 vaccine were among the main predictors of both vaccine acceptance and vaccine hesitancy [21], similar to our study. Variables such as trust in authorities, risk perception of COVID-19 infection, vaccine efficacy, current or previous influenza vaccination, and vaccine safety affected vaccine acceptance positively [22].

In our study, the rate of participants who were hesitant about vaccines was lower than those indicated in the literature: 22.4 of the participants indicated concern about adverse effects, 18% were concerned that the COVID-19 vaccines had been hastily developed and 9.6% believed that vaccines may be ineffective for protection from the infection. Concerns about adverse effects are the most common reasons for hesitancy [4][13]. The main reason for hesitancy in the Ethiopian study was concern about vaccine safety and/or vaccine side effects (37%) [20].

Of the participants in our study, 46.7% stated that they received information about COVID–19 from television and newspapers, 40.2% from social media and the internet, and 31.1% from the Ministry of Health. Only 7.2% indicated that they received information from primary healthcare physicians and 4.7% from universities.

However, according to the literature, healthcare professionals are considered the most reliable sources of guidance on vaccines against COVID-19 [10][15]. An early systematic review on COVID-19 uptake intention found that the primary

confidence factor was doctors' recommendation, motivating 80% of the Chinese and 62% of the Americans, compared to 54% if the FDA endorsed the vaccine safety [21]. Health workers were found to be the most trusted sources of guidance about COVID-19 vaccines in one study [7].

According to a study on 3,048 people, half of the participants stated that they would reconsider getting vaccinated if they were more informed about the vaccine. A message emphasizing specific health benefits is the most effective method of increasing vaccination intention [9]. However, even if health messages are adequate, opinions of people about the vaccine may change over time, as was experienced in the early months of 2021 in the USA, when anti-vaccination attitudes emerged [23].

Our study findings are in compliance with other research on COVID-19 vaccination issues in Cyprus. A study investigated vaccine awareness and opinions on the anti-vaccination movement among students at three faculties of Eastern Mediterranean University in Northern Cyprus [24]. Exposure to anti-vaccination propaganda was found to be increased according to the size of the cities where the participants were born. In total, 88.6% of the participants declared that they planned to vaccinate their children, while 24.5% were unwilling for getting the vaccine [24].

A study aiming to determine the COVID-19 vaccination intention among nurses and midwives in Cyprus in late 2020 was one of the early surveys on the island. A small proportion of the participants indicated they would accept a vaccine against COVID-19, while 70% were vaccine hesitant. The main reasons for not receiving the COVID-19 vaccine were similar to our study, such as the vaccine's speedy development and concern about side effects [15].

Another study from Cyprus investigated the role of education on vaccine uptake or hesitancy. This analysis revealed a significant correlation between higher educational level and higher vaccine acceptance [5]. The findings about the positive effects of education on perceptions toward vaccine effectiveness and vaccine acceptance are similar to the results of our study, as we found the education level of the participants to be influential on knowledge of COVID-19 and the intention to get vaccinated. However, correct knowledge about the disease did not affect vaccine uptake rate.

Our final words about the benefits of increasing vaccine uptake and overcoming vaccine hesitancy will be on a 2022 study comparing two Mediterranean island countries, Cyprus and Malta. The study highlighted the declining COVID-19 positivity and mortality rates as the vaccination progressed in both countries [25].

Conclusion

This study about COVID-19 vaccination in Northern Cyprus has revealed the vaccination uptake and hesitancy status and associated factors among the general population in this region, illustrating similar findings to those in the medical literature. In summary, the one dose vaccination rate was high but the full vaccination rate was lower than the world average. The majority believed that vaccines are effective and that COVID-19 vaccination would curb the spread of COVID-19. Consequently, 70% were of the opinion that vaccination should be mandatory for all people. Personal protection from the infection was the leading reason for vaccination willingness. Higher education was a predictor of better

knowledge of both COVID-19 vaccines and also vaccination intention. Most of the participants expressed trust in public health workers but preferred to get information from the media and the internet. Regarding concerns about COVID-19 vaccination, 16% of the people were seriously concerned and hesitant about getting the vaccine. Of these hesitant participants, 40% were concerned about the speedy authorization of the vaccines by the WHO, 22% about the adverse effects of the vaccines and 18% about the speedy development of the vaccines.

Statements and Declarations

Author Contributions: Each author has made substantial contributions to the manuscript version submitted regarding conceptualization, methodology, validation, formal analysis, data curation. OA drafted the manuscript and SC, SV, GA read and edited the draft. All authors have approved the submitted version and agree to be personally accountable for the author's own contributions and for ensuring the accuracy or integrity of any part of the work.

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Ethics approval (Institutional Review Board Statement): The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by the Institutional Ethics Committee of the Near East University. Ethics compliance approval was obtained by the decision of the Scientific Research Evaluation Board of the Near East University dated 27 September 2021, Project No. 1416.

Consent to participate (Informed Consent Statement): Informed consent was obtained from all subjects involved in the study. Written informed consent has been obtained from the participants.

Consent for publication (consent statement regarding publishing an individual's data or image): Not applicable.

Data Availability Statement: Data supporting the reported results can be provided by the authors upon reasonable request.

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