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The role of citizenship in the acceptance and completion of COVID-19 vaccine cycle in the resident population with foreign citizenship registered with the Umbrian Health Care System - An analysis of regional data

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Keywords: Vaccine Hesitancy; Citizenship; COVID-19
Parole chiave: Esitazione vaccinale; cittadinanza; COVID-19

Abstract

Introduction. *Non-italian citizens experienced less access to anti-COVID-19 vaccination, compared to the native population. Literature has found differences in adherence to anti-COVID-19 vaccination among these groups; however, there are apparently no studies that investigated the role of citizenship. Our objective was to investigate the role of citizenship in vaccine hesitancy toward anti-COVID-19 vaccination and the completion of vaccine cycle, in the non-Italian citizens resident in the Umbria Region.*
Study design. *This is a population study, performed on resident population in Umbria.*
Methods. *Population data were obtained thanks to a record linkage between the Regional Health Information System and the regional DBCOVID Umbria database. On this dataset, a descriptive and logistic regression analyses were performed.*
Results. *The 19.2% of non-Italian citizens did not take even one dose, 2.1% did not complete it and 40.6% did not take the additional dose. The range of values of which these results are an average, however, is very wide, suggesting important differences in COVID-19 vaccine up taking, among different citizenships. The logistic regression shows that citizenships with the highest probability of non-adherence to vaccination, compared to Philippine, was Romanian (OR=7.8), followed by Macedonian (OR=7.3) and Polish (OR=5.9).*
Conclusions. *The study provides evidence of differences among citizenships that pinpoint the importance of understanding the reasons behind these behaviours, to support decisions around health policies tailored to each citizenship.*

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Introduction

Vaccination hesitancy was defined as "the delay in accepting or refusing vaccinations despite the availability of vaccination services" (1), and is a complex phenomenon linked to personal, social, political and geographical factors. Recognizing the significance of this phenomenon, the Strategic Advisory Group of Experts (SAGE) on Immunization of the World Health Organization (WHO), has developed the following recommendations: 1. understanding the determinants of vaccine hesitancy; 2. highlighting organisational aspects that facilitate adherence; 3. evaluating the tools needed to counter this phenomenon (2). During the COVID-19 pandemic many countries have collected large-scale cross-sectional data regarding people's self-reported perceptions, intentions and behaviours about COVID-19 vaccination, to investigate reasons behind vaccine hesitancy. In describing the phenomenon of vaccine hesitancy, it is necessary to mention that, for some populations, healthcare services are considered hard to reach; in particular, non-Italian citizens have experienced less access to COVID-19 vaccination, compared with the native population (3-8). Expanding the scenario, non-Italian citizens generally record lower rates of utilisation of preventive services, including vaccinations, than native populations across the European Union member states (4,9, 10-19).

In respect to COVID-19, as stated above, international literature has found differences in adherence to vaccination among different groups of non-Italian citizens present in the study populations (3-8,9,20-25). A recent systematic review revealed that the overall COVID-19 vaccine hesitancy among migrants, refugees and foreign workers was 71.9% in the WHO European region, 36.5% in the Eastern Mediterranean region, and 31.0% in the Western Pacific region (4).

The literature has offered interesting insights into the differences between ethnic groups, which do not seem to behave in the same way about vaccination (3,26), also in relation to the religious beliefs that characterise each ethnic group (27). One study, in particular, found a greater vaccine hesitancy in sub-Saharan African and Eastern Europe people (26), in line with another systematic review that found a greater association with vaccine hesitancy among Eastern Europeans and Muslims (3).

The Italian literature seems to confirm that COVID-19 vaccination acceptance is uneven among non-Italian citizens (25, 28). Referring to the Umbrian scenario, the study by Primieri et al., 2023 (29) confirmed that, even in Umbria, non-Italian subjects were more likely neither to start nor to complete the vaccination cycle.

However, there are no studies investigating the citizenship role in vaccine hesitancy, even if it could be a proxy for the cultural identity to which people feel to belong. Indeed, the scientific literature either refers to "country of birth" and "minority ethnicity", however, these characteristics do not permit a comprehensive description of the identity that the individual chooses and with which he or she identifies, nor any changes in marital status chosen by the individual, such as the decision to apply for a change of residence or citizenship. The rationale of this study is precisely to further describe, with particular attention to the role of citizenship, the phenomenon of vaccine hesitancy in the population with foreign citizens of the study of Primieri et al., 2023 (29). This is necessary in order to further understand determinants of vaccine hesitancy and to tailor vaccination policies and strategies within one country that could facilitate vaccination adherence.

Objective

To investigate the role of citizenship in the phenomenon of hesitancy toward the uptake of COVID-19 vaccine and the completion of cycle, in the population with foreign citizens residing in Umbria.

Materials e Methods

For the selection of the study population, we started from the population with non-Italian citizenship, resident in Umbria as of February 28th, 2021 (N=90,714). In order to identify the population that was integrated with the territorial healthcare system, subjects not attended by a General Practitioner or Family Paediatrician in Umbria or with a health card that was not active during the study period (N=7,039) and subjects domiciled outside the region (N=351) were excluded from the study population. To allow for a proper assessment of outcomes, those exempted from COVID-19 vaccination (N=36) and minors (age <18 years) who could not independently choose whether to vaccinate or not (N=17,618) were excluded. Finally, to allow a better understanding of the role of citizenship, all those who belonged to a citizenship represented by fewer than 1,000 subjects were excluded (N=15,035) (Figure 1).

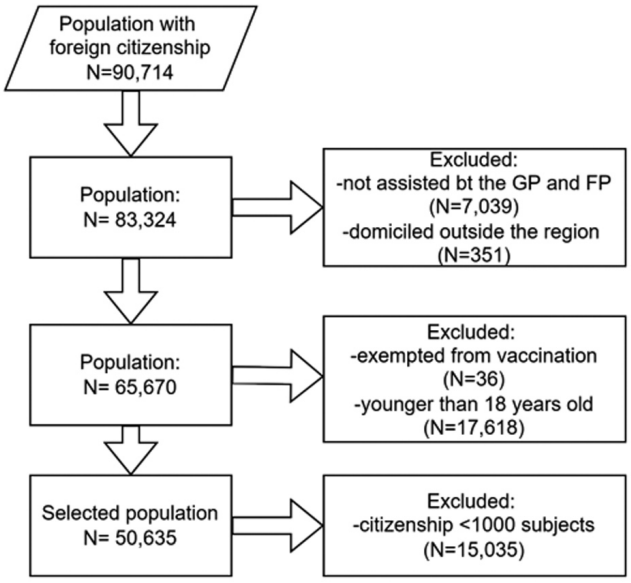

Figure 1 - Selection of the Study Population

1. Data Source

A record linkage was performed between the Regional HIS and the Regional DBCOVID Umbria database, using people's regional ID codes.

The Regional DBCOVID Umbria database collects individual data from the Regional SARS-CoV-2 Integrated Surveillance System as of February 2020; from DBCOVID Umbria we extracted data on doses of the vaccine administration in a year, as of February 28th, 2022. The HIS contains the personal data of the population served by the regional health service; from HIS we extracted: gender, age, residence, citizenship, possession of an "exemption" for chronic or rare disease or disability from medical causes. "Exemption" means that to some people, because of their disability or presence of the above described diseases no participation to the cost of the services is requested.

Data processing was carried out at the Epidemiology Service of the Prevention Department of the Umbria USL 1, which ensured the processing in compliance with privacy regulations. Vaccination coverages as of February 28th, 2022 in countries of origin of the citizenships present in Umbria were also retrieved from the Our World in Data website for elaborating the findings.

The study was conducted in accordance with the Declaration of Helsinki and approved by the Umbrian Regional Ethics Committee (ERC Umbria) (ERC N 4183/19, protocol code: 23155/21/ON; approval date: 27/10/2021). We extracted data about one dose vaccination coverage recorded in countries of origin as of February 28th, 2022 to compare it with one dose vaccination coverage recorded in our study (30).

2. Endpoint and covariates

Non-adherence to vaccination as of February 28th, 2022 was assessed as the primary endpoint, with adherence being defined as the administration of at least one dose of any COVID-19 vaccine.

As secondary endpoints, the following were considered:

- The failure to complete the primary vaccine cycle - understood as the administration, in various possible combinations, of two doses of Pfizer-BioNTech, Moderna or Vaxzevria vaccines, or as the administration of a single dose of Johnson&Johnson or as the administration of a single dose of any vaccine within one year of SARS-CoV-2 infection (previous or subsequent) - in those who had at least one dose of vaccine.
- Failure to uptake the booster dose in those who completed the primary vaccine cycle.

Possible delays in adherence, due to possible SARS-CoV-2 infections, were not considered in the assessment of endpoints.

As additional variables, the following were considered:

- sex (male or female);
- age (18-29, 30-39, 40-49, 50-59, 60+);
- citizenship (categorical variable with all citizenships as long as they were represented by at least 1,000 subjects);
- possession of a chronic or rare disease exemption or officially recognized disability from medical causes as a proxy for frailty (present or absent).

3. Statistical Analysis

Absolute and percentage frequencies and mean ± standard deviation (SD) were used to describe categorical variables and quantitative variables. A logistic regression model was used to investigate the role of individual citizenship by estimating odds ratios (OR) and associated 95% confidence intervals (95% CIs). All variables collected were included in the full-adjusted model. For each variable, the one with the lowest non-adherence rate was chosen as the reference category.

Statistical significance was set at $p<0.05$. All analyses were performed with Stata 18.0 statistical software.

Table 1 - Study population characteristics

Citizenship	N	%	Mean age	SD	Female		Male		Exemption for disease or invalidity	
					N	%	N	%	N	%
Romania	16,148	31.9	44.5	±12.6	11,024	68.3	5,124	31.7	2,415	15.0
Albania	9,467	18.7	44.0	±15.8	4,847	51.2	4,620	48.8	1,507	15.9
Morocco	6,515	12.9	43.6	±14.1	3,138	48.2	3,377	51.8	1,099	16.9
Ukraine	4,293	8.5	51.3	±14.0	3,559	82.9	734	17.1	780	18.2
North Macedonia	2,345	4.6	41.7	±13.3	1,023	43.6	1,322	56.4	337	14.4
Ecuador	2,117	4.2	42.6	±13.8	1,342	63.4	775	36.6	416	19.7
Moldova	1,829	3.6	44.7	±13.8	1,300	71.1	529	28.9	325	17.8
Poland	1,529	3.0	47.8	±13.0	1,204	78.7	325	21.3	304	19.9
Philippines	1,387	2.7	45.4	±135	788	56.8	599	43.2	224	16.1
Nigeria	1,382	2.7	36.7	±10.3	676	48.9	706	51.1	187	13.5
China	1,272	2.5	40.9	±12.11	698	54.9	574	45.1	114	9.0
Peru	1,202	2.4	44.7	±14.7	720	59.9	482	40.1	206	17.1
India	1,149	2.3	40.6	±12.7	476	41.4	673	58.6	179	15.6
Total	50,635	100	44.4	±14.0	30,795	60.8	19,84	39.2	8,093	16.0

Results

1. Description of the study population

The total population with non-Italian citizenship residing in Umbria as of February 28th, 2021 (henceforth just "non-Italian population") was found to consist of 90,714 subjects, divided into 160 different citizenships. The population selected for the study was represented by 50,635 subjects divided into 13 citizenships. Table 1 summarises the citizenships considered in the study and their characteristics (Table 1). Within the study population 30,795 (60.8%) were female subjects, while 19,840 (39.2%) were males. The mean age was 44.4 years, with a standard deviation of 14.0. The mean age of females was 45.7 (SD 14.0), while that of males was 42.4 years (SD 13.7) (Table 1). The most represented age group was 40-49 years old, namely the 25.3% of the total population. The middle age groups (30 to 59 years old) accounted for 68.7% of the population, with the remainder equally distributed between the 18-29 years old and 60 years and older age groups (Table 2). Out of the total of 50,635 individuals, 8,093 (16%) had a disability or chronic condition exemption. The most represented citizenships were Romanian (31.9%), Albanian (18.7%), Moroccan (12.9%), Ukrainian (8.5%) and, with almost the same number of subjects, Macedonian (4.6%) and Ecuadorian (4.2%).

Table 2 - Age groups of the study population

Age group	N	%
18 - 29	8,184	16.2
30 - 39	11,505	22.7
40 - 49	12,825	25.3
50 – 59	10,500	20.7
60 and older	7,621	15.1
Total	50,635	100

2. The role of citizenship in the uptake of vaccination

Out of the total study population (50,635), 9,717 subjects (19.2%) did not take even one dose, while 867 out of 40,918 people who started the vaccination cycle (2.1%) did not complete it and 16,257 out of 40,051 people eligible to receive the booster dose (40.6%) did not take the additional dose. The percentage of the unvaccinated population varies within the different citizenships from as low as 4.7% in the Filipino population, to as high as 27.3% in the Romanian population. Regarding the secondary endpoints, the rate of failure to complete the vaccination cycle ranged from 0.5% of Polish and Peruvian citizenships, to 3.8% of Ecuadorian citizenship and the failure to uptake the booster dose ranged from 21.1% in Poland to 58.2% in Ecuador. More results for the primary endpoint and secondary endpoints are shown in Table 3.

Table 4 shows the vaccination coverage, for those who have had at least one dose, recorded in our study

Table 3 - N (%) of non-adherent to vaccination by citizenship

Citizenship	Non adherence to vaccination ∑.N mnj°v		Failure to complete the vaccination cycle		Failure to uptake the booster dose	
	N	(% on those eligible)	N	(% on those eligible)	N	(% on those eligible)
Romania	4,409	27.3%	302	2.6%	4,751	41.5%
Albania	1,435	15.2%	151	1.9%	3,475	44.1%
Morocco	957	14.7%	163	2.9%	2,313	42.9%
Ukraine	815	19.0%	56	1.6%	1,188	34.7%
North Macedonia	611	26.1%	19	1.0%	699	35.8%
Ecuador	148	7.0%	66	3.8%	970	58.2%
Moldova	343	18.8%	19	1.3%	621	42.3%
Poland	348	22.8%	7	0.5%	278	21.1%
Philippines	65	4.7%	21	1.8%	323	27.8%
Nigeria	227	16.4%	36	3.1%	606	54.2%
China	152	11.9%	7	0.6%	373	33.4%
Peru	78	6.5%	6	0.5%	354	31.8%
India	129	11.2%	14	1.4%	306	30.4%
Total	9,717	19.2%	867	2.1%	16,257	40.6%

Table 4 - Comparison of vaccination coverage (at least one dose) of the citizenships of the study population with those of the countries of origin

Citizenship	National coverage (at least one dose) of the country of origin (%)	Umbrian data (%)
Romania	27.7	72.7
Albania	44.7	84.8
Morocco	66.3	85.3
Ukraine	39.7	81.0
North Macedonia	40.5	73.9
Ecuador	82.0	93.0
Moldova	32.8	81.2
Poland	56.5	77.2
Philippines	59.4	95.3
Nigeria	8.12	83.6
China	89.0	88.1
Peru	81.8	93.5
India	68.1	88.8

and the vaccination coverage, again for at least one dose, recorded in the countries of origin as of February 28th, 2022 (Table 4). The lowest national coverage was described among Nigerians (8.12%), followed by Romanians (27.7 %), while the highest national coverage was described in Chinese citizen (89%) an Ecuadorians (82%).

From the logistic analysis on the primary endpoint, a significant association for all citizenships considered, except for Peruvian, was highlighted. The citizenship with the highest probability of non-adherence to vaccination, compared to Philippine citizenship (that had the lowest non-adherence rate), was Romanian (OR=7.8), followed by Macedonian (OR=7.3) and Polish (OR=5.9). There was no evidence of differences between the two sexes. Regarding age, belonging to the over-60 class was associated with the higher risk of not adhering (OR=1.9) to vaccination. Finally, not having a disease exemption was found to be associated with a higher significant likelihood of non-adherence to vaccination (OR=1.2) (Table 5).

From the logistic analysis performed considering the secondary endpoint "not having completed the primary vaccine cycle," it turned out that Ecuadorian, Chinese, and Peruvian people did not have a significantly different risk of failing to complete the vaccination

Table 5 - Sociodemographic characteristics associated with nonadherence to vaccination in the study population (N=50,635)

Variables	OR	95%CI		p-value
Sex				
Male	(Reference)			
Female	1.012	0.964	1.062	0.626
Age				
18-29	1.203	1.111	1.302	<0.001
30-39	1.352	1.26	1.45	<0.001
40-49	1.054	0.983	1.131	0.141
50-59	(Reference)			
60+	1.935	1.794	2.087	<0.001
Citizenship				
Romania	7.784	6.051	10.014	<0.001
Albania	3.489	2.702	4.505	<0.001
Morocco	3.473	2.681	4.499	<0.001
Ukraine	4.334	3.337	5.63	<0.001
North Macedonia	7.316	5.607	9.547	<0.001
Ecuador	1.561	1.156	2.108	0.004
Moldova	4.582	3.477	6.039	<0001
Poland	5.95	4.51	7.849	<0.001
Philippines	(Reference)			
Nigeria	4.008	3.006	5.344	<0.001
China	2.804	2.074	3.792	<0.001
Peru	1.384	0.986	1.942	0.061
India	2.596	1.904	3.539	<0.001
Exemption for disease/invalidity				
Yes	(Reference)			
No	1.295	1.208	1.388	<0.001

cycle in respect to Filipinos. The citizenships with a higher risk of not completing the vaccine cycle were Macedonian (OR=7.2), Moroccan (OR=5.6), Nigerian (OR=5.5) and Romanian (OR=4.9). With regard to gender, being female showed a 17% significant increased probability of not completing the vaccination cycle. Regarding the age, 18-29 years old class showed a significant higher risk of not completing the cycle whereas the 40-49 years olds class a significant lower risk (OR=0.7) as compared to 50-59 years old people. Also, for this endpoint, not having a disease or disability exemption was associated with a higher, but not significant, probability of not completing the vaccine cycle (Table 6).

Finally, in the analysis for the endpoint "failure to uptake the booster dose" all citizenships showed a significant association, and the citizenships most at risk of not uptalking the booster dose were Macedonian (OR=4.9), Nigerian (OR=3.5), Albanian (OR=2.8), Moldavian (OR=2.8), Romanian (OR=2.7), Moroccan (OR=2.7), and Ukrainian (OR=2.5), the remainder having an OR less than 2. Regarding gender, females were significantly 8.7% less likely not to uptake the booster dose. Finally, with regard to age groups, compared with the 50-59 age group, the age group with a higher significant risk of not completing the booster dose was 18-29 years (OR=2.9), followed by the 30-39 (OR=2.2) and 40-49 (OR=1.4), while the over-60 had a 7% significant lower probability of not uptaking the booster dose. Finally, people not having a disease or disability exemption still depicted a higher significant risk of not receiving the booster dose as compared to the counterpart (OR=1.2) (Table 7).

Discussion

This study investigated the role of "citizenship" in the uptake of COVID-19 vaccines in order to study how this variable works in comparison to other

Table 6 - Socio-demographic characteristics associated with failure to complete the primary vaccine cycle in the study population (N=40,918).

Variables	OR	95%CI		p-value
Sex				
Male	(Reference)			
Female	1.177	1.02	1.359	0.026
Age				
18-29	1.484	1.205	1.827	<0.001
30-39	1.105	0.902	1.354	0.334
40-49	0.721	0.582	0.895	0.003
50-59	(Reference)			
60+	0.936	0.731	1.199	0.6
Citizenship				
Romania	4.913	2.317	10.421	<0.001
Albania	3.492	1.633	7.471	0.001
Morocco	5.65	2.644	12.073	<0.001
Ukraine	3.028	1.374	6.674	0.006
North Macedonia	7.259	3.317	15.884	<0.001
Ecuador	1.738	0.728	4.148	0.213
Moldova	2.346	0.983	5.601	0.055
Poland	3.508	1.485	8.291	0.004
Philippines	(Reference)			
Nigeria	5.51	2.439	12.451	<0.001
China	0.987	0.331	2.947	0.981
Peru	1.147	0.401	3.282	0.798
India	2.549	1.024	6.346	0.044
Exemption for disease/invalidity				
Yes	(Reference)			
No	1.169	0.945	1.446	0.15

characteristics more frequently used in the national and international literature, such as the individual's place of birth or ethnicity. As shown in the results, among the citizenships analysed, three had an adherence below 80%, namely Romanian (72.7%), Macedonian (73.9%), and Polish (77.2%), while all others showed adherence above 80%. In particular, three had an adherence above 90%: Ecuadorian (93%), Peruvian (93.5%), and Filipinos (95.3%). When considering that Italy, as of February 28th, 2022, had a vaccination coverage of at least one dose of 86% (30) it can be seen that the citizens did behave differently toward the COVID-19 vaccination. Only six out of thirteen citizenships (Moroccan, Chinese, Indian, Ecuadorian, Peruvian, and Filipino) have comparable or higher coverage than Italian citizenships. Regarding the secondary endpoints, as underlined in the results (see Table 3), there is a wide variability too, especially when compared to the Italian second dose uptake of 80% (30). In addition, the citizenships that show a higher percentage of vaccination up-take of at least one dose, are not always the same ones that also have higher up-take of second dose and booster dose. An example is Ecuadorian citizenship, which reports a 93% of population with at least one dose, but also reports a high percentage of population who refused the second and the booster dose: 3.8% and 58.2%, respectively. On the other hand, the citizenship that has a low percentage of at least one dose, such as the Romanian, also has a low rate of up-take of second dose and booster dose. The observed differences in vaccination adherence, across different citizenships and for different outcomes, highlight that the phenomenon of vaccination hesitancy is complex and suggests that citizenship plays a significant role in the behavior toward vaccination among the foreign populations. For such reason, it would not be correct to use a single variable which describes only

Table 7 - Socio-demographic characteristics associated with failure to uptake the booster dose in the eligible foreign study population (N=40,051)

Variables	OR	95%CI		p-value
Sex				
Male	(Reference)			
Female	0.913	0.875	0.954	<0.001
Age				
18-29	2.9	2.706	3.108	<0.001
30-39	2.23	2.092	2.376	<0.001
40-49	1.394	1.311	1.483	<0.001
50-59	(Reference)			
60+	0.93	0.862	1.004	0.062
Citizenship				
Romania	2.758	2.398	3.173	<0.001
Albania	2.812	2.439	3.241	<0.001
Morocco	2.682	2.318	3.102	<0.001
Ukraine	2.465	2.114	2.874	<0.001
North Macedonia	4.974	4.207	5.882	<0.001
Ecuador	2.015	1.709	2.376	<0.001
Moldova	2.808	2.366	3.334	<0.001
Poland	1.62	1.343	1.955	<0.001
Philippines	(Reference)			
Nigeria	3.486	2.911	4.176	<0.001
China	1.536	1.275	1.85	<0.001
Peru	1.85	1.537	2.227	<0.001
India	1.39	1.147	1.684	0.001
Exemption for disease/invalidity				
Yes	(Reference)			
No	1.206	1.134	1.284	<0.001

if a person is Italian or not. The reasons behind such different behaviors could improve the knowledge of the phenomenon and thus support decisions around health policies tailored to each citizenship.

Comparing the adherence to vaccination in our study population with the coverage of countries of origin, we appreciated that the citizenships that showed lower adherence had also very low coverage in their countries of origin. Nevertheless, while this is true, the contrary is not verified. In fact, citizenships such as Albanian, Ukrainian, Moldavian, as well as Moroccan and Indian, which had low national vaccination coverage, showed good adherence to vaccination in Italy. One bizarre percentage is the one referring to Nigeria's national coverage, which is 8.12 %, much lower than the Umbrian data of 83.6 %; although there is no literature or information to help explaining this, it is possible that it is related to data collection and reporting problems. The coverage (at least one dose) of Italian residents of Umbria, in the same period, was of 88.1% (29), a data higher than most of the national coverage of non-Italian citizenship, but lower than the national coverage of China (89,0%) and comparable to Ecuador (82,0%). Comparing instead the coverage of Italian residents of Umbria to non-Italian population of our study, 5 citizenships had a comparable or higher than Italian's vaccination coverage: Ecuador (93,0%), Philippines (95,3%), China (88,1%), Peru (93,5%) and India (88,8%).

This comparison prompted us to consider some characteristics of the countries of origin and some characteristics of the foreign populations living in Italy, which could contribute to explain this variability. We classified these factors into 3 macro-groups.

The first is the influence of the country of origin, which includes all factors, including the role that politicians and public figures played during the vaccination, that resulted in low adherence in

the country of origin, and which could have also influenced the community living in Italy. In Romania, for example, the role of politics, as well as the no vax community (31,32), seemed to have been central in deterring vaccination (33-35). It is rational, therefore, to assume that the Romanian population residing in Italy was also affected by the political situation in their country, which was characterised by distrust of institutions and media, to the point of being influenced in their choices about vaccination during the Italian vaccination campaign. A second factor, which may have indirectly influenced foreign communities in Italy, may have been a reduced risk perception related to increased natural immunity due to delayed distribution of vaccine doses in the country of origin, as was the case in Macedonia, for example (36-38). The vaccination campaign in Macedonia, in fact, started only in March 2021, finding a population which had already contracted COVID-19 and had had a low risk perception.

The second macro area is the level of integration of different citizenships within the Italian community. One of the factors describing the level of integration is definitely the length of time spent in Italy: actually, migrants with shorter stays record lower rates of access/use of health services. (12,39). In this respect it should be considered that 32.3% of the community members with Filipinos citizenship have been staying in Italy for more than 20 years, followed by Albanian, Chinese, Moroccan, and Peruvian, showing longer residence times than other citizenships (40). Similarly, the employment situation of non-Italian citizens allows us to open a point of view to read the phenomenon of vaccination adherence among different citizenships. In fact, the Ministry of Labor and Social Policy found that different communities had different employment rates in 2020 (41), and again, employment rates show Filipinos, Chinese and Peruvian citizenships at the top, which are the only ones to exceed 70% of employed, among both males and females. The type of occupation, in addition, could help to explain the adherence of some citizens to vaccination: in fact, since May 16th, 2021, the Green Pass has been introduced in Italy and it has allowed access to almost any activity or job that involves public or contact with people. It is reasonable to assume that for those communities primarily employed in Human Services, such as the Filipinos, being vaccinated probably meant being able to work or not (41).

The third macro area is represented by the socio-economic indicators, such as wealth and education level. With this respect, Filipinos citizens have a medium-high level of education: more than half of the workers belonging to that community have at least a high school diploma (50.8%), which is significantly higher than the percentage found among the non-EU population (40.4%). Peruvian citizenship also saw the number of Peruvian students increase by 2.4% in the 2020/2021 school year, against a slight average decline in non-EU students (-0.4 %) (42). Similarly, the Ecuadorian community, which accounts for 2% of the non-European population in Italy, in the same year, had a higher number of students in secondary school, accounting for 2.6% of enrolment out of the total number of non-EU students (43).

Strengths and limitations of the study

The innovative feature of the study is that it considered citizenship as a variable associated with the behaviour towards COVID-19 vaccination among Umbria's foreign population. Among the strengths of the study is the use of individual data derived from institutional and reliable information systems. Moreover, the data were considered over a sufficiently large time span to allow all subjects included in the study to be able to vaccinate.

Limitations include:

those related to the information system itself, such as the possibility that data from out-of-region vaccinations may not have moved into the regional system in a timely manner;

the absence of other relevant information in the data sources that could have been diriment in explaining the results, such as occupation and type of work or how long the subjects considered had been residing in Italy.

Finally, it should be considered that the analysis included only regular migrants, with recidency permit or citizency and Umbrian residence, excluding asylum seekers and refugees, whose conditions, therefore, are not described by this study.

It is necessary, in any case, to interpret the results with caution, because migrant populations in different countries differ in many respects, particularly with regard to rules for the acquisition of citizenship and migrants' rights regarding access to healthcare, so that findings have little transferability to different countries and social contexts. However, these results, in addition to being interesting because of the nature of the phenomenon they describe, with adequate accommodations, may be transferable to other Italian regional realities.

Conclusions

This study is the first to describe the role of citizenship in the adherence to COVID-19 vaccination. It provides evidence of relevant differences among different citizenships that pinpoint the importance of avoiding flattening ethnic groups and non-Italian citizens into inadequate categories that neither respect their diversity nor help in adapting health interventions to the multifaceted subpopulations that make up contemporary societies. However, further studies, both quantitative and qualitative, are needed to fully investigate the different causes that may have led to the observed differences among different citizenships.

Riassunto

Il ruolo della cittadinanza nell'accettazione e nel completamento del ciclo vaccinale anti-COVID-19 nella popolazione con cittadinanza non italiana, residente in Umbria e registrata nell'anagrafe sanitaria regionale umbra – un'analisi di dati regionali

Introduzione. I soggetti con cittadinanza non italiana hanno avuto meno accesso alla vaccinazione anti-COVID-19 rispetto alla popolazione italiana. La letteratura ha riscontrato differenze nell'adesione alla vaccinazione anti-COVID-19 tra gruppi di stranieri, tuttavia non esistono studi che indaghino il ruolo della cittadinanza. L'obiettivo è stato quello di indagare il ruolo della cittadinanza nell'esitazione alla vaccinazione anti-COVID-19 e nel completamento del ciclo vaccinale, nella popolazione con cittadinanza straniera residente in Umbria.

Disegno dello studio. Questo è uno studio di popolazione condotto sulla popolazione residente in Umbria.

Metodi. I dati di popolazione sono stati ottenuti con un record linkage tra l'Anagrafe Sanitaria Regionale e il database DBCOVID Umbria. Sul dataset ottenuto sono state effettuate analisi descrittive e di regressione logistica.

Risultati. Il 19,2% della popolazione non-italiana non ha effettuato nemmeno una dose, il 2,1% non ha completato il ciclo primario e il 40,6% non ha assunto la dose aggiuntiva. Il range di queste misure medie, tuttavia, è ampio, suggerendo importanti differenze legate alle cittadinanze. La regressione logistica mostra che le cittadinanze con una probabilità più alta di non aderire alla vaccinazione, rispetto alla Filippina, sono state la Rumena (OR=7.8), la Macedone (OR=7.3) e la Polacca (OR=5.9).

Conclusioni. Lo studio fornisce un riscontro delle differenze esistenti tra le diverse cittadinanze, differenze che evidenziano l'importanza di comprendere le ragioni alla base di questi comportamenti, per supportare le decisioni sulle politiche sanitarie adatte a ciascuna cittadinanza.

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