



Investigation into Knowledge and Adherence To Vaccination and Screening Campaigns among Immigrants in the Marche Region, Central Italy

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Abstract

Promoting preventive health through vaccination and screening is a key public health goal. Immigrant populations often show lower uptake compared to the general population, highlighting the need for targeted interventions. This study examines knowledge and adherence to vaccination and screening programs among immigrants residing in the Marche Region, Central Italy. To evaluate the socio-economic and cultural characteristics of immigrants, as well as their participation in vaccination and screening programs. A structured questionnaire was developed ad hoc. Data collection was conducted via assisted interviews with a convenience sample of immigrants in the Province of Pesaro-Urbino. The study sample was mostly female 59 (84.3%), with participants primarily from Ukraine 30 (42.9%) and Moldova 15 (21.4%). The average age was 53 years, and they had lived in Italy for 17 years on average. The majority of immigrants had a high school diploma or higher degree 56 (52.9%). Most immigrants 66 (96%) reported receiving all mandatory childhood vaccinations in their country of origin, however, vaccination coverage declined after migration to Italy. Although 89% of participants were aware of disease prevention through screening, only 27% had participated in screening programs in their country of origin, whereas, 71% had a cancer screening in Italy, primarily through public health invitations. Screening and vaccine hesitancy were mainly linked to lack of information or absence of invitations (76%), time constraints (14%), low trust in screening efficacy (7%). This study highlights the low adherence to vaccination programs among the immigrant population in Italy, emphasizing the need for policymakers and health authorities to design local level interventions to improve communication strategies, enhance healthcare accessibility and ultimately contribute to better health outcomes, cost savings, and more equitable healthcare systems.

Keywords Immigrants · Screening · Vaccine · Screening Adherence · Italy

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Background

Vaccination and screening are critical components of public health strategies that aims at reducing mortality and optimizing healthcare resources [1–3]. The promotion of a preventive health culture through the active participation of populations in vaccination and screening campaigns is a key public health objective, which could significantly contribute to the reduction of chronic disease prevalence and the improvement of the burden of preventable illnesses [2].

Vaccination is one of the most effective measures for preventing infectious diseases. Vaccines have drastically reduced the incidence and transmission of diseases such as measles, mumps, rubella, pertussis, diphtheria, varicella and poliomyelitis [1, 4]. Vaccines against influenza, Human Papilloma Virus (HPV), and Hepatitis B Virus (HBV), moreover, are essential public health tools that are particularly effective in preventing severe outcomes among high-risk groups such as the elderly and individuals with chronic diseases and in cancer prevention [5–8].

Cancer screening campaigns represent another pivotal prevention strategy. Cancer remains one of the leading causes of death worldwide yet estimates suggest that 30–50% of cancer cases could be prevented through effective implementation of prevention and early detection strategies [9]. Cancer screening enables the early detection of cancer before the onset of symptoms. Early diagnosis often results in less invasive treatments, shorter recovery periods, and improved survival rates, thereby reducing cancer morbidity and mortality [10]. In Italy, population-based screening programs are provided free of charge for breast and cervical cancers in women and colorectal cancer in the general population. These programs use active invitations to target specific age and gender groups, offering screening tests, diagnostic evaluations and second-level treatments [11].

Immigration presents significant socioeconomic challenges, including the transmission of vaccine-preventable diseases. Immigrants are more vulnerable to these diseases as they often come from areas with poor health conditions and low vaccination rates, which can accelerate the spread of these diseases. In addition, precarious living and housing conditions faced by immigrants in host countries also impact their health status. Living in deprived areas is associated with lower participation in vaccination programs and opportunistic screenings [12–14]. Several studies report disparities in vaccination coverage among immigrants compared to the general population, particularly in the uptake of the HPV and HBV vaccines [3–5]. Four main barriers to vaccination have been identified: cultural factors, lack of information about immunization, vaccines, or diseases, insufficient access to healthcare, and vaccine hesitancy

driven by concerns over side effects, safety, and perceived inefficacy [9, 14]. Disparities in cancer screening are also well-documented and have persisted over time among immigrant populations [15–18].

Increasing vaccination and screening coverage among immigrant populations would not only improve integration but also provide an opportunity to offer access to interventions with proven effectiveness. This approach helps address health inequalities and overcome social barriers associated with lower socioeconomic status, limited knowledge of prevention programs, language barriers, and cultural norms that may impede the adoption of preventive healthcare services [19].

Despite several strategies aimed at reducing disparities in vaccination and cancer screening among immigrant populations, significant challenges remain [16]. This study aims to investigate the knowledge and adherence to vaccination and screening campaigns within the immigrant population residing in Marche Region, Central Italy.

Materials and Methods

Participants

The total population of the Marche Region, according to the 2023 census, was 1,482,746, including 132,011 (8.9%) immigrants as of December 31, 2022 (Italian National Institute of Statistics) [20].

A questionnaire was developed to assess the socioeconomic and cultural status, as well as the adherence of immigrants to vaccination and screening programs. The questionnaire was administered anonymously by a dedicated nurse through an assisted interview, to a sample of the foreign population residing in Pesaro-Urbino province (Marche region, Italy) during the two-year period from 2022 to 2023. Recruitment method was performed through convenience sampling, by enrolling participants from community networks, health services and cultural associations [21].

Data Collection

The questionnaire collected information on the following variables: country of origin, year of birth, gender, marital status, education level, proficiency in Italian, type of employment, presence of children, family members residing in Italy, financial situation, current occupation, length of stay in Italy, registration with a general practitioner or pediatrician of choice, vaccination history (type of vaccination, place and time of vaccination), COVID-19 vaccination status, awareness that, through specific tests, certain

diseases could be identified before they cause symptoms, knowledge of free screening programs, screening history (type of screening, place and time of screening), participation via invitation or voluntary, reasons for not undergoing a screening or vaccination.

Measures

A descriptive analysis was performed to summarize the demographic characteristics and lifestyle habits of the immigrant population. For analytical purposes, participants were grouped into two categories based on their country of origin: (1) Eastern European countries (Romania, Ukraine, and Moldova) and (2) all other countries. This classification was selected for two main reasons: (i) immigrants from Eastern Europe represent the largest subgroup within the immigrant population in Italy [21], and (ii) women from these countries are at increased risk of cervical cancer due to the high prevalence of HPV infection [22]. To evaluate differences between the two groups, univariate analysis was performed using the chi-square test, $p < 0.05$ was used for significance.

The study protocol received approval by Ethics Committee of Polytechnic University of Marche (protocol n. 0165650 on 04/08/2023). Patient anonymity was guaranteed throughout the entire data analysis and results reporting process as required by European Regulation 2016/679 (EU Regulation 2016/679).

Results

A total of 70 immigrants were interviewed, as shown in Fig. 1, the majority of participants originated from Ukraine 30 (42.9%) and Moldova 15 (21.4%), and most were female (84.3%).

The average age of participants was 53 years (range: 22–74), and they had been living in Italy for an average of 17 years (range: 1–43). In terms of education, the majority held a high school diploma (52.9%), followed by a university degree (25.7%) and a middle school diploma (20%). Only 1.4% reported they had no qualifications. A summary of the sample's characteristics was provided in Table 1.

Immigrants from Eastern European countries had been living in Italy for a shorter period (17 vs. 19 years, $p = 0.031$), included a higher proportion of women (88% vs. 76%, $p = 0.027$), and were more likely to hold a university degree (35% vs. 5%, $p < 0.01$) compared to those from other countries. Compared to immigrants from other countries, those from Eastern Europe were less likely to have family members residing in Italy (45% vs. 81%, $p < 0.01$), to report an average financial situation (47% vs. 62%, $p = 0.033$), and to have advanced proficiency in the Italian language (12% vs. 29%, $p < 0.01$). In terms of employment, a higher proportion of Eastern European immigrants held indefinite contracts (67% vs. 38%, $p < 0.01$) and were employed as salaried workers (27% vs. 14%, $p = 0.023$).

Vaccinations

Most immigrants (96%) reported having received all mandatory childhood vaccinations in their country of origin.

Fig. 1 Distribution of immigrants' birth Countries

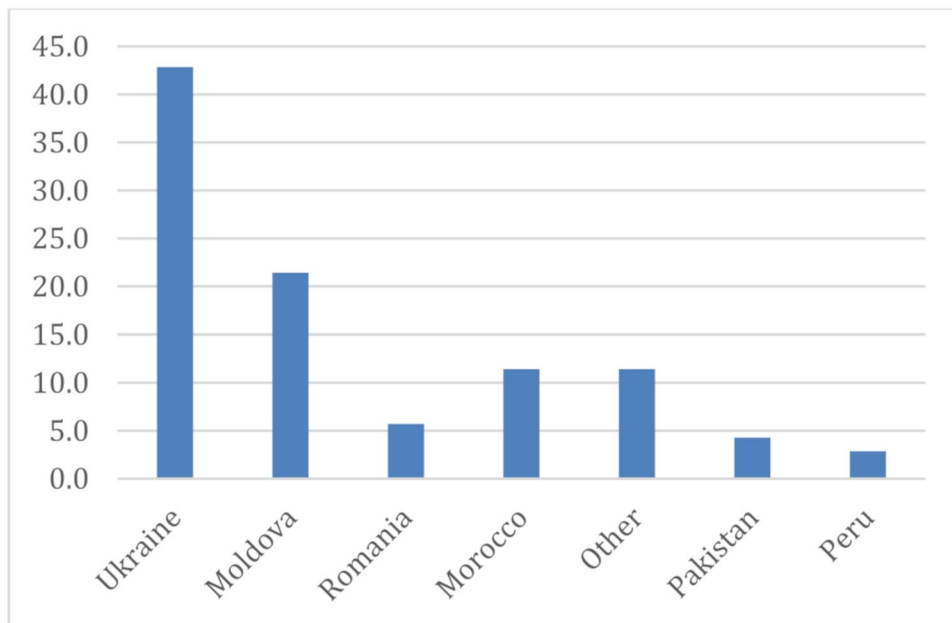


Table 1 Sample characteristics

	Whole sample (N=70)		Eastern Europe (N=49)		Others (N=21)		p
Median age (range) years	53 (22–74)		59 (22–64)		49 (23–63)		0.078
Years in Italy	17 (1–43)		17 (1–24)		19 (1–43)		0.031
	n	%	n	%	n	%	
Females	59	84%	43	88%	16	76%	0.027
Married/cohabiting	41	59%	28	57%	13	62%	0.471
With children	55	79%	40	82%	15	71%	0.067
Family lives in Italy	39	56%	22	45%	17	81%	<0.01
Instruction							
Middle school	14	20%	6	12%	8	38%	<0.01
High School	38	54%	27	55%	11	52%	0.671
Degree	18	26%	17	35%	1	5%	<0.01
Car ownership	27	39%	19	39%	8	38%	0.885
House of property	8	11%	6	12%	2	10%	0.651
Family financial situation							
Good	6	9%	5	10%	1	5%	0.178
Average	36	51%	23	47%	13	62%	0.033
Poor	28	40%	21	43%	7	33%	0.145
Current occupation							
Caretaker	26	37%	16	33%	10	48%	0.031
Unemployed	10	14%	6	12%	4	19%	0.171
employee	16	23%	13	27%	3	14%	0.023
Cleaning	7	10%	7	14%			
Self-employed, business owner	2	3%			2	10%	
student	2	3%			2	10%	
other	7	10%	7	14%			
Type of employment contract							
fixed term	4	6%	1	2%	3	14%	<0.01
indefinite period	41	59%	33	67%	8	38%	<0.01
other	7	10%	4	8%	3	14%	0.175
nd	18	26%	11	22%	7	33%	0.082
General practitioner in Italy	68	97%	48	98%	20	95%	0.248
Free-choice pediatrician in Italy^a	15	54%	7	54%	8	53%	0.887
Knowledge of Italian language							
advanced	12	17%	6	12%	6	29%	<0.01
elementary	19	27%	13	27%	6	29%	0.753
insufficient	3	4%	2	4%	1	5%	0.733
intermediate	36	51%	28	57%	8	38%	<0.01

^a The percentage was calculated based on the number of immigrants with children and family members living in Italy

In contrast, vaccination coverage after relocation to Italy was notably lower: 13% HBV, 10% influenza, 18% *Tetanus* booster, and 79% COVID-19 (Table 2). Compared to immigrants from Eastern Europe, a significantly higher proportion of individuals from other countries had HBV (24% vs. 9%, $p<0.01$), influenza (19% vs. 3%, $p<0.01$) and HPV (10% vs. 2%, $p=0.01$) vaccination.

Screening

Most immigrants declared to be aware that certain diseases can be detected through specific tests before symptoms appearance (89%) and were familiar with screening programs (81%) (Table 3). Despite this awareness, only 27%

of participants had taken part in screening programs in their country of origin, with significantly more individuals from Eastern Europe reporting participation compared to those from other regions (33% vs. 14%, $p<0.01$). A high proportion of immigrants (71%) reported having participated in cancer screening programs available in Italy. Among them, 94% had undergone a Pap test (primarily women from countries outside Eastern Europe: 100% vs. 72%, $p<0.01$), 64% had received a mammography, and 52% a colorectal cancer screening (Table 3). It is worth noting that in most cases (74%), the Pap test had been performed following an invitation from the public health system of Marche region.

Table 2 Adherence to vaccination programs

	Total (N=70)		Eastern Europe (N=49)		Other (N=21)		p
	n	%	n	%	n	%	
Vaccinated	67	96%	46	94%	21	100%	0.043
Type of vaccine in Italy^a							
Hepatitis B	9	13%	4	9%	5	24%	<0.01
Influenza	7	10%	3	7%	4	19%	<0.01
Tetanus Recall	12	18%	9	20%	3	14%	0.259
HPV	3	5%	1	2%	2	10%	<0.01
COVID-19	55	79%	37	80%	18	86%	0.259

^a The percentage was calculated based on the number of vaccinated individuals in each group

Table 3 Knowledge and adherence to screening programs

	Total (N=70)		Eastern Europe (N=49)		Other (N=21)		p
	n	%	n	%	n	%	
Are you aware that, through specific tests, some diseases can be detected before they cause symptoms?	62	89%	43	88%	19	90%	0.65
Are you aware that there are free screening programs?	57	81%	40	82%	17	81%	0.86
Have you ever been screened in your home country?	19	27%	16	33%	3	14%	<0.01
Have you taken advantage of screening programs in Italy?	50	71%	34	69%	16	76%	0.27
If so, which ones?							
Pap test*	47	96%	31	94%	16	100%	<0.01
Mammography*	32	65%	22	67%	10	63%	0.44
Colorectal screening	26	52%	17	50%	9	56%	0.40
If you have had a Pap test, how?^a							
Invitation	35	74%	24	56%	11	69%	0.67
Spontaneous	12	26%	9	21%	3	19%	0.72

^a The percentage was calculated based on the number of females in each group

Motivations for Non-Adherence To Vaccination and Screening

The main reasons reported for not participating in screening or vaccination included: lack of information or absence of an invitation to join a screening programs (76%), time constraints (14%), low confidence in the effectiveness of screening or vaccination for disease prevention (7%), and fear, embarrassment, or religious beliefs (3%).

Discussion

In this study, we examined the adherence of an immigrant population residing in the Marche Region (central Italy) to vaccination and screening campaigns. While the majority (96%) of the participants reported receiving all mandatory childhood vaccinations in their country of origin, their adherence to vaccination programs in Italy was markedly lower: 13% for hepatitis B, 10% for influenza, 18% for tetanus boosters, and 79% for the COVID-19 vaccine. Notable differences emerged between immigrants from Eastern Europe and those from other regions, with a lower vaccination rate for hepatitis B (9% vs. 24%, $p < 0.01$), influenza

(3% vs. 19%, $p < 0.01$), and HPV (2% vs. 10%, $p = 0.01$) among Eastern Europeans. Neither group showed any participation in meningococcus vaccination. These findings are consistent with previous research highlighting significant disparities in vaccine uptake among immigrant populations, both globally and within Italy [7, 17]. During the 2022–2023 influenza season, 20.2% of the Italian population received the influenza vaccine [22], a rate significantly higher than the 10% observed among immigrants ($p < 0.01$). Similar trends have been reported in earlier studies; for example, during the 2012–2013 season, influenza vaccination coverage was 16.9% among immigrants compared to 40.2% among Italians [5].

Vaccine hesitancy remains a critical global public health issue, as it can facilitate the spread of preventable diseases. Multiple studies have identified various factors contributing to vaccine hesitancy in immigrant populations, including perceived low risk of contracting vaccine-preventable diseases, distrust in vaccine safety and efficacy, cultural barriers, and challenges in registering with a general practitioner [7, 17]. In our study sample, similar barriers were identified, including a lack of information or invitations to participate in screening programs (76%), time constraints (14%), low confidence in the efficacy of vaccines and screenings (7%),

and fear, embarrassment, or religious concerns (3%). These results are consistent with previous studies showing that adherence to screening was influenced by socio-economic factors, education and health information gap among immigrants [23–26].

In contrast to vaccination, our findings revealed a more favorable scenario regarding participation in screening programs. While 73% of respondents had not participated in screening programs in their country of origin, 71% reported participation in screening campaigns in Italy. Immigrants from Eastern Europe reported higher participation in screening programs in their countries of origin compared to those from other regions (33% vs. 14%, $p < 0.01$). However, all women from non-Eastern European countries underwent Pap tests, compared to 72% of women from Eastern Europe ($p < 0.01$). These findings appear to contrast with previous reports indicating that immigrant populations typically show lower adherence to screening programs than native Italians, particularly for cervical and breast cancer [23]. This discrepancy may be attributed to demographic, cultural, religious, and socioeconomic differences among the study populations. Furthermore, geographical disparities in screening coverage across Italy, where participation tends to decline from north to south, may also contribute to the observed differences in screening adherence.

In the Marche Region, screening adherence rates during 2022–2023 were 81.4% for cervical screening, 80.2% for mammography, and 55.3% for colorectal screening, all of which exceeded the national averages of 77.5%, 72.9%, and 46.3%, respectively [26–29]. In our study, immigrant participation in these screenings was comparable, with 96% undergoing a Pap test, 65% receiving a mammography, and 52% completing colorectal screening. Other studies, such as those by Francovic [16] and Bianco [23], reported lower participation rates among immigrants in cervical and breast cancer screening programs. However, these findings are based on data from 2012 to 2013. It is possible that improvements in screening campaigns and information dissemination over the past decade have contributed to increased participation. Alternatively, delays caused by the COVID-19 pandemic may have impacted screening activities, as observed in the Marche Region, where cervical screenings decreased by 21.6%, breast screenings by 0.5%, and colorectal screenings by 7.6% [30, 31]. Consequently, screening rates may have rebounded in the subsequent years, particularly in 2022–2023. No significant differences in screening adherence were observed based on country of origin.

A key finding was that more than half of the immigrants who did not participate in screenings stated that they did not receive an invitation or sufficient information. Promoting health literacy and providing comprehensive information

are essential to improving access to the free screening services offered by the Region [2]. Given that over 80% of immigrants report basic to intermediate proficiency in Italian, it is reasonable to assume that screening invitations are generally understood, an assumption further supported by the high participation rates observed. Nonetheless, expanding the distribution of invitations and providing additional information in immigrants' native languages could further enhance screening uptake.

Interestingly, 89% of participants reported being aware of the importance of screening tests, and 81% knew that these services are offered free of charge. However, we believe that targeted health literacy interventions are still needed to address the disparities observed in cancer screening and vaccination rates. Such efforts could significantly enhance the effectiveness of public health prevention strategies, particularly among vulnerable populations [2, 32].

Study Limitations

This study has several limitations. The small sample size and the use of convenience sampling from a single province within the Marche Region may introduce selection bias. Additionally, the study was descriptive in nature, and data was collected through interviews of a convenience sample, which may be subject to reporting bias. Convenience sampling is considered as a practical approach for researching migrant populations, since the heterogeneity, mobility, and sometimes precarious legal status of these groups makes probability sampling less feasible. Although this method limits generalizability, it provides timely insights and can guide targeted interventions or lay the groundwork for future, more representative studies.

These limitations prevent us from drawing definitive conclusions and restrict the generalizability of our findings. Future studies with larger sample sizes and involving participants from multiple Italian provinces are needed.

New Contribution to the Literature

This study highlights the low adherence to vaccination programs among the immigrant population in Italy, emphasizing the need for policymakers and health authorities to design local level interventions to improve communication strategies, and enhance healthcare accessibility. Furthermore, understanding vaccination and screening uptake supports efforts to prevent outbreaks of vaccine-preventable diseases and to promote early detection of illnesses, ultimately contributing to better health outcomes, cost savings, and more equitable healthcare systems.

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Data Availability No datasets were generated or analysed during the current study.

Declarations

Competing Interests The authors declare no competing interests.

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