



# Vaccination coverage of Roma children, and barriers and attitudes of Roma parents

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## Abstract

**Introduction:** The population of Roma children is an especially vulnerable social group, experiencing a greater prevalence of health risk factors and presenting poor vaccination rates.

**Aim:** The objective of this study was to examine the vaccination coverage among the Roma child population in a specific prefecture of Greece and to assess the barriers and attitudes of Roma parents regarding vaccination.

**Materials and methods:** This cross-sectional study included two hundred Roma children aged 2 to 12 years old residing in ten settlements of one prefecture in Greece. Data were collected through the use of two structured questionnaires, which consisted of questions regarding the demographic characteristics of the Roma child population, information related to vaccination, Roma settlements, and information regarding the barriers and attitudes of Roma parents about vaccination.

**Results:** The percentage of vaccination coverage rose to 61.63%, and the majority of the children had vaccination documents. The vaccination coverage was not associated with the age of the children but their sex had an impact. The vaccination rate was greater in the larger cities, and it was also affected by the settlement. Fifty-one percent of the Roma parents did not report any difficulty regarding the vaccination of their children, and only 9% reported barriers related to financial reasons. Moreover, 21.5% of parents had insufficient information about the necessity of vaccinations, while seventeen expressed a lack of motivation.

**Conclusions:** The present study found that the vaccination coverage among Roma children in one prefecture of Greece was low. Health professionals need to implement targeted Roma interventions considering their cultural sensitivities.

## Keywords

child population, immunization, obstacles, Roma, vaccines

## Introduction

Roma is among Europe's most vulnerably situated ethnic minority groups.<sup>[1,2]</sup> Their population is estimated to be approximately 10 to 12 million individuals dispersed

across the member states of the European Union<sup>[1-3]</sup>, with a significant presence in Central and Eastern Europe, numbering approximately six million<sup>[1]</sup>. In contrast to the majority of populations, Roma experience various disadvantages such as substandard housing, lower education level,

poor living conditions, and social exclusion.<sup>[2,4-8]</sup> Previous studies have revealed that compared to the non-Roma populations, Roma have poorer health status, experience shorter life expectancy, and present higher rates of various communicable and non-communicable diseases.<sup>[4,5]</sup> Research data demonstrate that vaccination coverage is lower amongst Roma compared to the general population.<sup>[9]</sup> The greatest obstacle to immunization among Roma communities is the access to the health care system.<sup>[10]</sup> The population of Roma children is an especially vulnerable social group and presents a greater prevalence of health risk factors.<sup>[4]</sup> Studies on the vaccination coverage of Roma children have revealed poor immunization rates.<sup>[11-14]</sup> Duval et al.<sup>[15]</sup> analyzed the data from the Roma Regional Survey 2011 implemented in twelve countries of Central and South-East Europe and concluded that the Roma children have a lower probability of being vaccinated compared to non-Roma children.

Estimates of the Roma population in Greece ranged from 120,000 to 300,000, and according to the Council of Europe, there are around 265,000 Roma people residing in Greece (2.47% of the population).<sup>[16,17]</sup> Studies from Greece on Roma health are limited; however, there are research data that showed that preventable communicable diseases and higher levels of mental health symptoms are more common among them.<sup>[18,19]</sup> Pappa et al.<sup>[20]</sup> found that the prevalence of chronic diseases was higher in Roma with low educational level. Another study showed that prefecture, settlement type, sex, age group, living with a partner, presence of depression and anxiety symptoms, and food insecurity were associated with self-perceived health status and with the presence of a chronic disease.<sup>[21]</sup> There is also a lack of published studies on the vaccination rates of Roma children in Greece. In Greece, Roma children are vaccinated according to the National Vaccination Program (NVP).<sup>[22]</sup> The Child Health Booklet (CHB), which has been proved to be correctly filled out and maintained by the parents of the great majority of children in the general population, is usually used to record vaccinations, which are normally given to residents of the country free of charge.<sup>[23]</sup> According to a previous study using a sample of 641 families, 33% of Roma children were only partially vaccinated, and 15% of them had not received any vaccine dose.<sup>[24]</sup> Two important vaccination studies conducted at the national level on the child population of the Roma group reported poor vaccination coverage.<sup>[25,26]</sup>

The health status and the vaccination coverage of Roma, as well as the vaccination coverage of their children, are an object of ongoing investigation and researchers in the field have noted that more studies are necessary to gain a better understanding of this minority and then deploy or use vaccine strategies that over time may result in improved vaccination rates.<sup>[9,15,20]</sup> The issue of how many Roma children are vaccinated is still being looked into and is very important for public health. The scientific community will benefit from research data on Roma children's vaccination coverage estimates being made public.

## Aim

Considering the aforementioned, the aim of the present study was to investigate the vaccination coverage of the Roma child population in one prefecture of Greece and to examine the barriers and attitudes of Roma parents about vaccination.

## Materials and methods

A cross-sectional study design was used in order to investigate the vaccination coverage of the Roma children of a Greek prefecture and the barriers and attitudes of Roma parents about vaccination. Ten settlements from three different regions in the Ilia prefecture participated in the study. Four settlements, called Vidia, Kolireika, Syntriada, and Tragano, came from the capital of the Ilia prefecture named Pyrgos. Four settlements, known as Papakafka, Kardamas, Tsichleika, and Kentro came from the city of Amaliada. Two settlements, named Lefkochori and Pigadakia, came from an important population center, called Gastouni. The study was carried out between February 2021 and September 2021. Participants included in the present study were Roma children aged 2 to 12 years old and came from settlements in the prefecture of Ilia. The choice of age limit was based on the National Vaccination Program (EPC) but also on the fact that many Roma children, due to their special living conditions, complete the vaccination program at older ages. A minimum of three families were required for a settlement to be considered for inclusion. Roma families except in the prefecture of Ilia and non-Greek Roma families were excluded. The sample size was considered sufficient (n=200), with the mean values of the variables approximating the overall mean of the population from which the sample was drawn. All data were collected by the use of two questionnaires which had been administered previously to the Roma population from Greece by Dr. Papamichail after his permission.<sup>[26]</sup> The questionnaires consisted of questions regarding Roma settlements, the demographic characteristics of the Roma child population of the area (settlement – sex – date of birth – age), general information regarding vaccination, and the total number of vaccine doses administered to the Roma child population and the use of the CHB. Information about the barriers and attitudes of Roma parents about vaccination was also included in the questionnaires. The questionnaires were completed by Roma parents, mediators, and mostly by health professionals employed in community centers and medical facilities in the municipalities of the prefecture of Ilia. The study protocol was approved by the Ethics Committee of the General Hospitals of Ilia (approval number: 28897/2020). The parents of children participating in the study provided informed consent.

The frequency and mean values in the descriptive statistics for the quantitative and qualitative variables (percentages) were used. To assess the association between vaccination

coverage and the age of the children, Pearson's rho correlation and Pearson chi-square ( $\chi^2$ ) were calculated. The t-test was performed to determine differences in the percentage of vaccination coverage between boys and girls. In order to examine the effect of the city and the settlement on the level (percentage) of vaccination coverage, a one-way Analysis of Variance (ANOVA) was conducted. The dependent variable was the percentage of vaccination coverage and the independent variables were the three cities (Pyrgos – Amaliada – Gastouni) and the ten settlements of the cities. The Cronbach  $\alpha$  coefficient of the questionnaires used was calculated and was considered adequate ( $\alpha=0.808$ ). Statistical significance was set at  $p<0.05$  and analyses were conducted using SPSS statistical software (version 25.0).

## Results

The total sample size was two hundred ( $n=200$ ) Roma children from the Greek prefecture of Ilia. The majority of the Roma children came from the city of Amaliada (52%). The mean age of the children was 7.87 years ( $SD=3.1$ ). The majority of them (53.5%) were boys, while the remaining 46.5% were girls. One hundred thirty-two children (66%) had a CHB, 19% (38 children) had a vaccination card, 10% (20 children) were registered in the health records of a medical facility, and for the remaining 5% (10 children) the vaccination data were obtained from the information of their parents. The vast majority (80%) of the children had been vaccinated according to the NVP for the pediatric population. Based on the registration of vaccines in the CHB, 55% (110 children) of Roma children were considered fully vaccinated. The vaccination level of the remaining 45% (90 children) was considered to be insufficient since they had not received a complete vaccination. The percentage of vaccination coverage rises to 61.63% based on information from vaccination cards and the CHB. The vaccination coverage was not associated with the age of the children ( $r=-0.056$ ,  $p=0.427$ ). The Pearson chi-square test also showed that the age of the children was not associated with the vaccination coverage ( $\chi^2=10.264$ ,  $p=0.091$ ). The t-test revealed that the level of vaccination coverage among Roma children differs between the gender ( $t=2.010$ ,  $p=0.046$ ), given that the average vaccination rate for girls was higher than the average for boys (66.99% vs. 56.97%). The ANOVA test showed that the city factor affects the level of vaccination coverage of the Roma child population ( $F=7.128$ ,  $p=0.001$ ). The percentage of vaccination is higher in the cities of Amaliada (66.62%) and Pyrgos (65.26%) than the general average of the total sample (61.63%), while in the area of Gastouni, this percentage is at low levels (43%). The ANOVA test showed that the settlement factor significantly affects the level of vaccination coverage of the Roma child population ( $F=13.663$ ,  $p=0.00$ ). The settlements of Tragano, Kentro, Kolireika, and Kardamas recorded the highest levels of vaccination coverage, of the order of 94.69%, 90.88%, 81.38%, and 79.36%, respectively. In the settlements of Papakafka (63.23%),

Pigadakia (54.68%), and Vidia (51.34%) the percentages are close to the average (61.63%) of the total sample. The lowest levels of vaccination coverage are recorded in the settlements of Tschleika (38.48%), Syntriada (22.21%), and Lefkochori (9.13%). **Table 1** presents information on the number of children and the percentage of vaccination in each city and per settlement, while **Table 2** provides the relevant information regarding the fundamental features of each settlement. The questionnaire regarding parents' vaccination barriers and attitudes included the question, "Is there anything that makes it difficult for you to vaccinate your child?" with four possible answers for barriers ('No difficulty,' 'Financial reasons,' 'Family reasons,' and 'Difficulties concerning health services') and two potential answers for attitudes ('Lack of information' and 'Lack of motivation'). A total of 200 parents answered the questionnaire. Fifty-one percent of the parents did not report any difficulty regarding the vaccination of their children and only 9% reported barriers related to financial reasons. Barriers linked to family reasons were expressed only by 6% of the Roma parents. Concerning Roma parents' attitudes, 21.5% of them had insufficient information about the necessity of vaccinations while seventeen parents (8.5%) expressed a lack of motivation (**Table 3**).

**Table 1.** Distribution of Roma children and percentage of vaccination per city and per settlement

Cities and settlements of the cities	Number of participating children per city and per settlement N (%)	Vaccination coverage per city and settlement (%)
City of Pyrgos	57 (28.5 %)	65.26 %
Vidia	23 (11.5%)	51.34%
Kolireika	13 (6.5%)	81.38%
Syntriada	7 (3.5%)	22.21%
Tragano	14 (7%)	94.69 %
City of Amaliada	104 (52%)	66.62 %
Papakafka	50 (25%)	63.23%
Kardamas	8 (4%)	79.36%
Tschleika	20 (10%)	38.48%
Kentro	26 (13%)	90.88 %
City of Gastouni	39 (19.5%)	43%
Lefkochori	10 (5%)	9.13%
Pigadakia	29 (14.5%)	54.68%

## Discussion

The vaccination status of Roma children is an important public health concern. Therefore, the aim of the present study was to investigate the vaccination coverage of the Roma child population in one prefecture of Greece and to examine the

**Table 2.** Basic characteristics of the included settlements

Name of settlement	Distance of settlement from medical facilities	Basic amenities (electricity, water, bathroom/drainage)
Vidia	2 kilometers	E: Yes W: Yes B/d: more than half houses
Kolireika	5 kilometers	E: Yes W: Yes B/d: more than half houses
Syntriada	800 meters	E: No W: No B/d: No
Tragano	2 kilometers	E: Yes W: Yes B/d: Yes
Papakafka	2 kilometers	E: Yes W: Yes B/d: more than half houses
Kardamas	5 kilometers	E: Yes W: Yes B/d: more than half
Tsichleika	2 kilometers	E: more than half houses W: Yes B/d: more than half houses
Kentro	> 10 kilometers	E: Yes W: Yes B/d: Yes
Lefkochori	2 kilometers	E: No W: Yes B/d: doubtful
Pigadakia	500 meters	E: more than half houses W: Yes B/d: No

E: electricity; W: water; B/d: bathroom/drainage

**Table 3.** Roma parental barriers and attitudes regarding vaccination

	N	%
<b>Barriers</b>		
No difficulty	102	51.0
Financial reasons	18	9.0
Family reasons	12	6.0
Difficulties concerning health services	8	4.0
<b>Attitudes</b>		
Lack of information	43	21.5
Lack of motivation	17	8.5

barriers and attitudes of Roma parents about vaccination. The current study found that vaccination coverage among Roma children was poor, yet the majority of them possessed immunization records. These results are consistent with earlier studies from Greece, which also showed low vaccination coverage for all vaccines among children of Roma<sup>[26,27]</sup> and also demonstrated that for the majority of the children, a vaccination document was available<sup>[25,26]</sup>. The same finding has also been reported about the Roma children by Stojanovski et al.<sup>[13]</sup> Another finding from the current study was that the sex of Roma children had an impact on the level of vaccination coverage. As a result, girls had a greater immunization rate than boys on average. However, this finding does not support the previous research results, where the female sex was associated with lower coverage.<sup>[26]</sup> According to the literature, gender discrimination against Roma women in the healthcare setting has been documented.<sup>[28]</sup> In the present study, the age of the children (2 to 12 years old) was not associated with vaccination coverage. Conversely, Kraigher et al.<sup>[11]</sup> found that preschool-aged Roma children showed higher vaccination coverage than the school-aged Roma generation. Possibly school attendance may play a role in the initiation of the vaccination.

The size of the city had an impact on the level of vaccination coverage among the Roma children. Hence, the vaccination rate was greater in Amaliada and Pyrgos, the larger cities, than it was in Gastouni, the smaller city. Also, the vaccination rates were associated with the settlement. We anticipated that this was a result of the settlement's distance from the health services. However, what was observed was that the settlements that recorded the highest levels of vaccination coverage (Tragano, Kentro, Kolireika, and Kardamas) aside from the fact that they belong to the larger cities, their distance from the health facilities ranges from 2 to more than 10 kilometers. In contrast, the lowest levels of vaccination coverage were recorded in the settlements (Lefkochori, Tsichleika, and Syntriada) whose distance from the health facilities varies from 800 meters up to 2 kilometers. Therefore, perhaps it is possible to conclude that the low vaccination rates were not caused by the distance between the settlements and the health facilities. Conversely to our findings are those from the study of Papamichail et al.<sup>[26]</sup> who reported that proximity ( $\leq 2$  km) of the settlement to the health service was positively associated with the rates of vaccination even if these rates were at a minimum level. Additionally, it was observed that the living conditions were better in the settlements with greater vaccination rates compared to those with lower vaccination rates. Living circumstances are probably a factor that can affect vaccination rates.

It was anticipated that the reporting obstacles mentioned by parents could contribute to some extent to the explanation of the low immunization rates. Contrary to expectations, a small percentage of Roma parents reported barriers related to financial reasons, family reasons, or difficulties concerning health services. Approximately half of the parents did not report any difficulty regarding the vaccination of their children. This finding supports previ-

ous research results where parental reporting of barriers to vaccination did not have a positive association with several vaccination coverage indices.<sup>[26]</sup> The high spatial mobility<sup>[12,29]</sup>, the precarious socio-economic conditions<sup>[30,31]</sup>, the low level of formal education, and the low awareness of vaccination as a preventive measure<sup>[31]</sup> are some of the explanations for the low vaccination rate among Roma that have been pointed out by authors of previous studies. We also expected to notice that many parents would have mentioned a lack of information and/or motivation. However, the percentage of the above attitudes cannot be regarded as significant, since 21.5% of Roma parents had insufficient information about the necessity of vaccinations and only seventeen of them expressed a lack of motivation. We may speculate that a possibly higher rate of coverage would be apparent if these percentages were lower.

The findings in the present study are subject to some limitations. First, the present data are from only three municipalities in the Ilia prefecture, while this prefecture consists of seven municipalities. So, our results are indicative of this prefecture, and they cannot be generalized. Furthermore, our findings are representative to some extent of only one prefecture in Greece. This municipality-specific limitation may introduce selection bias. Also, the study is limited by the lack of statistical correlations between the vaccination coverage of the Roma child population and the barriers and attitudes of Roma parents about vaccination. Therefore, the conclusions that emerged without the existence of statistical methods need to be interpreted with caution.

However, the current study provides important additions to the field of research by addressing the vaccination coverage of the Roma children's population as well as the vaccine-related barriers and attitudes of Roma parents. Although we did not include all municipalities of the Ilia prefecture, our results came from the main municipalities and can be regarded as an initial indication of the rate of vaccination of Roma children in the prefecture. The present study is also one of the few studies providing research information on the vaccination coverage of the Roma child population in Greece. Additionally, the presentation of the percentages of vaccine-related barriers and attitudes of Roma parents residing in Greece may contribute to better understanding this minority group.

## Conclusions

The present study found that the vaccination coverage among Roma children in one prefecture of Greece was low, regardless of the fact that the majority of them had vaccination documents. In addition, the distance between the settlements and the health facilities seemed not to affect the low vaccination rates. On the other hand, greater vaccination rates were observed in the settlements where living conditions were better. About half of the Roma parents did not report any difficulty regarding the vaccination of their children.

One aspect of the public health challenge is the vaccination of Roma children. Some of the elements that have been considered to contribute to greater vaccination coverage include clear policies and national campaigns.<sup>[32]</sup> Previous research findings demonstrated that the increasing collaborative health education activities improved vaccination rate among refugees.<sup>[33]</sup> Therefore, the implementation of health literacy programs in the Roma population could actually be a realistic target for the healthcare community. The existence of translation services and cultural competence training are both crucial elements that can remove communication barriers in order to increase vaccine literacy.<sup>[34]</sup>

Additional Roma community-based research is needed. Future studies are expected to focus not only on vaccination coverage among Roma children but also on better investigating the beliefs of Roma parents around vaccination. Researchers of this vulnerable minority would be more effective in their study if they are aware that face-to-face contact is considered to be a more successful method of interacting with communities and gaining their trust, using community vaccine promotion outreach strategies.<sup>[35]</sup> More health programs, national campaigns, and clear policies are needed to increase the vaccination rate in the Roma children population. It is crucial to implement targeted Roma interventions by health professionals, considering their cultural sensitivities.

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## Competing interests

The authors have declared that no competing interests exist.

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