

# Parents' and caregivers' role toward childhood vaccination in Albania: assessment of predictors of vaccine hesitancy

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*Parole chiave: Vaccinazioni dell'infanzia, esitazione vaccinale, ritardo vaccinale, Albania*

## Abstract

**Background.** Vaccination has saved millions of lives through the protection of individuals and populations from communicable diseases. Vaccine hesitancy, defined as the delay in acceptance or refusal of vaccines despite the availability of vaccination services, has become a growing global concern. The objective of this study was to investigate parents'/caregivers' hesitancy toward childhood vaccination and its predictors in Albania.

**Study design.** A cross-sectional survey was conducted.

**Methods.** The data comes from a survey conducted on a sample of parents/caregivers (89.6% mothers) of children aged 6 months to 8 years at health care vaccination centers in seven Albanian cities from December 2020 to February 2021. Parents/caregivers (one per child) were interviewed by trained healthcare staff using a standardized questionnaire on six main content domains, including immunization behavior, beliefs about vaccine safety and efficacy, attitudes about vaccines, vaccination confidence, estimation of vaccine delay, and the intention to immunize children against SARS-CoV-2, and a self-reported hesitancy. The Albanian Ministry of Health approved the questionnaire, after it was translated, validated and adapted to the local setting. Statistical analyses included independent sample *t*-tests ( $p < 0.05$ ) and a logistic regression (OR; 95% C.I.).

**Results.** A total of 475 parents/caregivers of children aged from 6 months to 8 years, attending childhood vaccination in public health services, were interviewed. To the question "how hesitant you are about childhood vaccination", a high number of parents/caregivers (46%) responded that they do not feel hesitant at all, and 32% were not hesitant, a small number of parents/caregivers said they are very hesitant (5%) or somewhat hesitant (12%).

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*A binary logistic model was fitted to the data to test the hypothesis regarding the relationship between parental vaccine hesitancy and possible predictors. A lower parental attitude toward childhood vaccines (OR = 3.7; 95% C.I. 1.102-12.421), a health center with a high vaccine delay (OR = 2.878; C.I. 95% 1.735-4.773), and low confidence in health staff information (OR = 2.042; 95% C.I. 1.156-3.605) were all independent predictors of parental vaccine hesitancy. Regarding intention to vaccinate children against COVID-19, when available, nearly 75% of parents/caregivers showed hesitancy.*

**Conclusions.** *Our results highlighted the role of positive parents'/caregivers' attitudes toward childhood vaccines followed by high staff confidence and good health center organization in order to deal with vaccine hesitancy, particularly for traditional and well-known childhood vaccines. Nevertheless, the hesitancy can be a critical barrier for childhood vaccination when we have to introduce a new vaccine, as is demonstrated in the recent vaccination campaign against the ongoing pandemic of SARS-CoV2.*

## Introduction

Vaccination has saved millions of lives through the protection of individuals and populations from vaccine-preventable diseases (VPDs) (1). However, while most parents/caregivers vaccinate their children according to the recommended schedule, this success is being challenged by parents/caregivers who delay or refuse vaccines. Vaccine hesitancy, defined as the delay in acceptance or refusal of vaccines despite the availability of vaccination services, has grown as a global concern. In reality, vaccine-hesitant individuals are a heterogeneous group in a continuum, ranging from total acceptance to complete refusal (2), and this varies across time, context, and type of vaccine (3). This behavior is related to prior beliefs about vaccines (4), the perceived benefits of vaccines, and attitudes towards vaccines; it is influenced by factors such as complacency, convenience, and confidence (5). Inadequate or poor communication about vaccines, particularly their safety and effectiveness, can contribute to vaccine hesitancy (6). Confidence in vaccination programs is crucial for maintaining high coverage rates. However, across the European region, vaccine delays and refusals are contributing to declining immunization rates in a number of countries and are leading to increases in

disease outbreaks (7). For example, recent data show that the European region had a 4-fold increase in measles cases in 2017, compared to the previous year (8). A better understanding of the influence of historical and political contexts in Eastern Europe on vaccine confidence can be essential, since many Eastern European countries share similar traditions in the organization of vaccination programs. Often, childhood vaccination has been made mandatory in these countries. However, while vaccine hesitancy is better studied in Western countries, more evidence about the trends in Eastern Europe may be necessary (9). When specifically considering Albania, a small study in 2017 revealed wide-spread concerns about vaccine side effects or vaccine effectiveness (10). In addition, as in several other European countries, during 2018, Albania experienced a measles outbreak, with nearly 300 cases reported. The measles outbreak in Albania in 2018 highlighted that the country's health system is still suffering from maintaining vaccine coverage (11).

### *Aim of the study*

The primary goal of this study was to investigate parent's hesitancy toward childhood vaccination and its predictors in Albania.

## Materials and Methods

The study was designed in June 2020, along with the development of an interviewing tool, adapted from a standardized questionnaire (12). The translation of the questionnaire from the original language to the Albanian language was made by two mother tongue independent translators. The questionnaire was submitted to a small sample of 25 Albanian parents/caregivers in order to validate it. It was approved by the Ministry of Health and Social Protection of Albania (October 2020).

A survey was conducted in seven Albanian cities (Tirana, Elbasan, Durres, Vlora, Kruja, Lezha, and Shkodra) from December 1<sup>st</sup>, 2020, to February 29<sup>th</sup>, 2021, on a sample of parents/caregivers (one per child) of children aged 6 months to 8 years, the period when vaccine shots are recommended. Trained staff interviewed parents in health care centers. The interviewing tool was used to identify vaccine-hesitant parents (VHP) through six main content domains, including immunization behavior, beliefs about vaccine safety and efficacy, attitudes about vaccines, vaccination confidence, estimation of vaccine delay, and intention to immunize children against SARS-CoV-2, and a specific score of hesitancy as self-reported hesitancy. The parents/caregivers interviewed were those present at the health care centers for childhood vaccination services. Information on children's vaccination delays and adherence to immunization programs was completed by consulting the individual vaccination schedule of each child. The vaccination delay was calculated based on the dates of the last vaccine shot and the age of the children.

The Ethical Committee of the Ministry of Health and Social Protection of Albania (n.303/46 of October 16, 2020) approved the conduct of this study. Participants were informed about the aim of the study and the usage of data. They were assured of the

confidentiality of the data and the anonymity of their identity. Written consent was obtained from each participant before the interview. A unique, codified number was used to identify each respondent. The statistical elaboration of the data was performed using IBM SPSS Statistics (version 26). Data collected have been presented as numbers and percentages. Differences between means were analyzed by using student t-tests. A dichotomized variable was generated in order to split the center by a delay in vaccinations. Although several definitions for vaccine delays exist, the most commonly used is a delay of 30 days or more after the recommended age for each dose (13). A logistic regression was used to investigate possible drivers of vaccine self-reported hesitancy that emerged from the key responses of the questionnaires: parents' attitudes and in health care providers, traditional religion, level of education, and vaccine delay. Adjusted odds ratios (ORs) were calculated with their 95% confidence interval (95% CI). P-values < .05 were considered as statistically significant.

## Results

A total of 475 parents of children aged 6 months to 8 years, attending pediatric vaccination in public health services, were interviewed throughout seven cities in Albania. As shown in Table 1, most of the samples were recruited in Tirana's health centers, reflecting the catchment area of the capital city (Table 1).

Table 1 shows the socio-demographic characteristics of the sample investigated. The responders were mainly mothers (89.6%), the other caregivers were fathers or grandmothers. More than half of the sample has a higher education level (degree or post-graduate degree). Most of the responders had a relatively young age, belonging to the category of 24–35 years old (44.9%), followed by those who were >35 years old

Table 1 - Socio-demographic characteristics of the sample, n = 475.

Characteristics	Numbers (%)
<b>Caregiver</b>	
Parents (mothers)	426 (89.6)
Other caregivers (fathers, grandmothers)	49 (10.4)
<b>Traditional Religion</b>	
Christian (Catholic and Orthodox)	163 (34.3)
Muslim	312 (65.7)
<b>Educations of parents</b>	
Illiterate/Elementary school	7 (1.4)
Middle School/professional school	70 (14.8)
High School	115 (24.2)
University Degree	233 (49.1)
Postgraduate degree	49 (10.3)
<b>Age group of the parents</b>	
<24	71 (14.9)
24–35	218 (45.9)
>35	186 (39.2)
<b>Age group of the children</b>	
0–6 months	163 (34.3)
6–12 months	84 (17.7)
12–24 months	98 (20.6)
24–36 months	51 (10.7)
4–8 years	79 (16.6)
<b>City</b>	
Durres	60 (12.6)
Elbasan	71 (14.9)
Kruja	25 (5.3)
Lezha	44 (9.3)
Shkodra	51 (10.7)
Tirana	181 (38.1)
Vlora	43 (9.1)

(40%), while only two were 18 years old. Regarding religious traditions, more than 65% were Muslims. Most of the families had only one child (42.5%), followed by those who had two children (40.2%) and those who had three children (15.6%). Only eight of the families had four or more children.

Figure 1 reports the answers to the question “how hesitant are you about childhood vaccination?”. A high percentage of parents (46%) answered that they do not feel hesitant

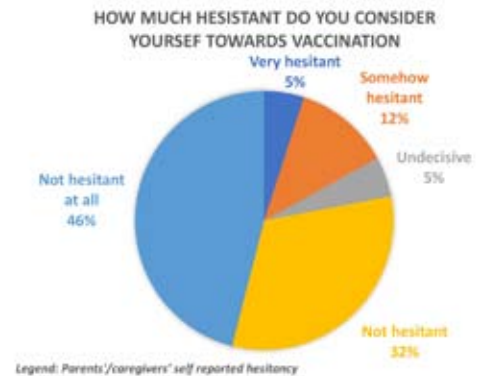


Fig. 1 - Legend: Parents'/caregivers' self reported hesitancy

at all, while 32% were not hesitant. On the contrary, a small percentage declared to be very hesitant (5%) or somewhat hesitant (12%), and 5% of them reported to be undecided.

Table 2 reports the level of parents' confidence, attitudes, behaviors, and perceptions toward child vaccination. More than 86% of the respondents reported not having postponed the vaccination for reasons other than disease and allergy. This answer shows the good confidence of Albanian parents in childhood vaccines. More than 97% of the parents agreed with the phrase, “it is the parental responsibility to vaccinate his/her child,” while 2.3% were undecided. Only one of them disagreed with the declaration. Most of the parents (nearly 95%) answered that they would vaccinate their second child, confirming their confidence in vaccines. However, 19 of them replied “no” to this question. Almost 60% of parents were referred to as being concerned about the vaccines' adverse events or vaccine unsafety. More than 30% said that “their children receive more vaccines than necessary.” When asked whether they trusted the information offered by the health staff on vaccinations, more than 85% of the respondents were confident with

Table 2 - Parents'/caregivers' attitudes, behaviors, beliefs, and confidence about vaccines and self-reported hesitancy.

Questions	Answers		
	Yes n. (%)	No n. (%)	I don't know n. (%)
<b>Parents'/caregivers' behaviors</b>			
Have you ever decided to postpone vaccinating your child for reasons other than disease and allergy?	60 (12.6)	409 (86.1)	6 (1.3)
If you had another child, would you vaccinate him/her with all the vaccines of the calendar?	450 (94.7)	6 (1.3)	19 (4.0)
Would you vaccinate your child when the COVID-19 vaccine will be available?	113 (23.8)	162 (34.1)	200 (42.1)
<b>Parents'/caregivers' attitudes</b>			
Is it my role as a parent to vaccinate my child?	463 (97.4)	1 (0.2)	11 (2.3)
<b>Parents'/caregivers' beliefs</b>			
Children receive more vaccines than necessary	145 (30.6)	217 (45.7)	113 (23.8)
Are you concerned about adverse vaccine events?	302 (63.6)	151 (31.8)	22 (4.6)
Are you concerned about vaccine unsafety?	274 (57.7)	173 (36.4)	28 (5.9)
<b>Parents'/caregivers' confidence in health staff</b>			
Do you trust the information given by the health staff on vaccination?	404 (85.1)	15 (3.2)	56 (11.8)

the message received. Nearly 34% of parents said they would not vaccinate their children with COVID-19 vaccines if they were available, and more than 40% were unsure, for a total vaccine hesitancy of nearly 75%.

Table 3 reports vaccination rates expressed in months by geographical distribution. When considering the total sample, the percentage of children with delayed vaccination was 31.2% (n = 148). Durres had the highest percentage of delays (48.3%),

followed by Kruja (40%), Vlora (39.5%), and Elbasan (36.6%). Tirana, Shkoder, and Lezha registered a delay of less than 30%. As regards vaccination delays, a mean value of 1.21 months  $\pm$  2.42 was recorded in the overall sample, with a minimum of 1 month to a maximum of 24 months. A significant difference was observed when classifying the health centers into two groups, based on the percentage of delays registered (above and below 30%). Durres, Kruja, Vlora,

Table 3 - Delay in vaccinations expressed as frequency and as length, by geographical distribution.

City	% of delay	Mean vaccination delay in months
Durres	48.3%	1.63 $\pm$ 2.25 SD
Elbasan	36.6%	1.68 $\pm$ 2.84 SD
Kruja	40.0%	1.76 $\pm$ 2.58 SD
Lezha	15.9%	0.39 $\pm$ 1.10 SD
Shkodra	19.6%	0.67 $\pm$ 1.66 SD
Tirane	27.1%	1.09 $\pm$ 2.59 SD
Vlore	39.5%	1.51 $\pm$ 2.55 SD
Total	31.2%	1.21 $\pm$ 2.42 SD

Elbasan (mean delay in months:  $1.64 \pm 2.56$  SD) vs. Tirana, Shkoder, and Lezha (mean delay in months:  $0.90 \pm 2.27$  SD);  $p = 0.001$ . A new variable was generated by dichotomizing centers by months of delay (below or above or equal to 1 month) in order to better investigate the differences in delay in the health centers: (Shkodra, Tirane, and Lezha) vs. centers with high delays (Vlora, Kruja, Elbasan, and Durres). The two groups showed a significant difference in the mean months of delay (mean months: 0.9 vs 1.64;  $p = 0.001$ ). A binary logistic model was fitted to the data to test the hypothesis regarding the relationship between vaccine hesitancy and possible predictor variables (low parents' attitudes, low confidence in health staff information, traditional religion, education, and health center with high vaccine delay).

In Table 4, we report only results with statistically significant relevance. According to the model, a lower parental attitude toward childhood vaccines (OR = 3.7; 95% C.I. 1.102-12.421), a health center with a high vaccine delay (OR = 2.878; C.I. 95% 1.735-4.773), and low confidence in health staff information (OR = 2.042; 95% C.I. 1.156-3.605) were all independent predictors of parental vaccine hesitancy (Table 4).

## Discussion

This study offers an insight into potential determinants of vaccine hesitancy among Albanian parents attending childhood vaccinations in public health care centers. In our sample, the percentage of parents not

hesitant at all (46%) was in agreement with other Eastern European countries, such as Poland (45%), Lithuania (46%), and Ukraine (49%), as reported in the European large-scale study, while the percentage of parents somewhat hesitant (12%) was lower than the European median (24%) (7).

When talking about vaccine delays, the self-reported answer (nearly 13%) was lower than the results of the European study (20%) (7) but higher than those of a recent Albanian study (10%), probably based on underestimated self-reported parents' perceptions susceptible to recall bias (14). As a matter of fact, even in our sample results, self-reported answers exceed the calculated delay deducted from the child vaccine cards by 31%. However, the delay reported by parents seems to be mainly due to the temporary health condition of the child (15).

The majority of parents believed in the importance of childhood vaccination and considered vaccinating their children part of their role as parents. Similar results were found in Canada (90%) and Australia (92%) (16, 17). Our results from the logistic regression showed that the first driver of vaccine hesitancy is low parents' attitude, followed by health centers with high vaccine delays and low confidence in health staff, especially when they represent the principal source of information about vaccination (18).

These results highlight the complex relationship between parental vaccine hesitancy and vaccine delay in health centers. As reported by Bianco et al. (19), vaccine delays beyond health centers can be a determinant of vaccine hesitancy among parents. Therefore,

Table 4 - Potential determinants of vaccine hesitancy (binary logistic model).

	B	S.E.	Wald	df	Sign.	Exp(B)	95% C.I. Exp (B)	
							Lower	Upper
Low confidence in health staff	.714	.290	6.057	1	.014	2.042	1.156	3.605
Low parents'/caregivers attitude	1.308	.618	4.484	1	.034	3.700	1.102	12.421
Health center with high vaccine delay	1.057	.258	16.773	1	.000	2.878	1.735	4.773
Constant	-2.135	.228	87.494	1	.000	.118		

the role of health staff is essential in order to increase confidence in childhood vaccination among parents (20). On the other hand, in centers where vaccination delays are more accentuated, they might cause problems for the service organization itself (21).

Regarding the COVID-19 vaccine, our results are similar to an Italian study that reported parents' intention to not immunize children against SARS-CoV-2 at 41.2%, while the remaining 21.2% were uncertain. The high rates of COVID-19 vaccine hesitancy in both Albanian and Italian families demonstrate the difficulties when attempting to introduce a new type of childhood vaccine (22).

## Conclusion

Our results highlighted the role of positive attitudes of the parents followed by high confidence in the staff and good organization of the health center, in order to deal with vaccine hesitancy, particularly for traditional and well-known childhood vaccines. However, the hesitancy can be a critical barrier when we have to introduce a new vaccine, as demonstrated by the recent vaccination campaign against the ongoing pandemic of SARS-CoV2.

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## Riassunto

**Ruolo genitoriale e vaccinazioni dell'infanzia in Albania: valutazione dei predittori di esitazione vaccinale**

**Razionale.** Le vaccinazioni hanno salvato milioni di vite umane proteggendo individui e popolazioni da numerose malattie infettive. L'esitazione a vaccinarsi,

definita come l'incertezza, la riluttanza e il ritardo nel vaccinarsi fino al rifiuto del vaccino nonostante la loro disponibilità, è diventata una preoccupazione crescente a livello globale. L'obiettivo di questo studio è stato di investigare l'esitazione dei genitori verso le vaccinazioni infantili in Albania e i suoi principali predittori.

**Disegno dello studio.** È stata condotta un'indagine trasversale.

**Metodi.** I dati sono stati raccolti nell'ambito di un'indagine condotta su un campione di genitori (89,6% madri) di bambini al momento della vaccinazione presso i servizi vaccinali pubblici di sette città dell'Albania distribuite su tutto il territorio nazionale. L'indagine è stata condotta da Dicembre 2020 a Febbraio 2021. I genitori sono stati intervistati da uno staff sanitario formato ad utilizzare il questionario standardizzato, composto da sei maggiori aree di interesse, che includevano domande sui comportamenti verso le vaccinazioni dei figli, le credenze sull'efficacia e la sicurezza dei vaccini, le attitudini e la confidenza alle vaccinazioni, il ritardo nell'eseguirle e l'intenzione di vaccinare i bambini per la SARS-CoV-2, nonché l'auto-dichiarata esitazione circa i vaccini. L'analisi statistica ha incluso t-test per campioni indipendenti ( $p < 0.05$ ) e una regressione logistica (OR; 95% I.C.).

**Risultati.** Un totale di 475 genitori di bambini tra i 6 mesi e gli 8 anni di vita è stato intervistato mentre era in attesa di visita pediatrica pre-vaccinale. Alla domanda "Quanto sei esitante verso le vaccinazioni dell'infanzia?", un'alta percentuale di genitori pari al 46% risponde che non si sentono per nulla esitanti mentre il 32% non sono esitanti; una piccola quota pari al 5% risponde di essere molto esitante e il 12% di essere poco esitante.

La regressione logistica ha permesso di testare la relazione tra l'esitazione vaccinale dei genitori e i suoi possibili predittori. Una scarsa attitudine genitoriale verso i vaccini dei figli (OR = 3.7; 95% I.C. 1.102-12.421), un centro sanitario con elevato ritardo nelle vaccinazioni (OR = 2.878; C.I. 95% 1.735-4.773), e una minore confidenza nelle informazioni fornite dallo staff sanitario (OR = 2.042; 95% C.I. 1.156-3.605) sono state tutte condizioni indipendenti correlate significativamente all'esitazione genitoriale verso le vaccinazioni infantili.

Riguardo l'intenzione di vaccinare i bambini per il COVID-19, quando disponibile, circa il 75% dei genitori ha mostrato esitazione.

**Conclusioni.** I nostri risultati sottolineano il ruolo essenziale di un'attitudine genitoriale positiva verso le vaccinazioni infantili, seguita dall'elevata confidenza nello staff sanitario e da una buona organizzazione nei centri sanitari, al fine di contrastare l'esitazione vaccinale per le vaccinazioni tradizionali dell'infanzia. Purtroppo, l'esitazione vaccinale risulta una barriera quando si introduce una nuova vaccinazione, come nella campagna vaccinale contro l'attuale pandemia da SARS-CoV2.

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