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Experience with Parental Vaccination Refusal and Attitudes about Vaccinations of Pediatricians in Greece

H. C. Maltezou[1*], D. Gkentzi[2], I. Grivea[3], N. Chaliasos[4], E. Galanakis[5], A. Pavli[1], P. Katerelos[1], G. Syrogiannopoulos[3], E. Roilides[6] and M. Theodoridou[7]

[1]Department for Interventions in Health-Care Facilities, Hellenic Center for Disease Control and Prevention, Athens, Greece.
[2]Department of Pediatrics, University of Patras, Patras, Greece.
[3]Department of Pediatrics, University of Thessaly, Larissa, Greece.
[4]Department of Pediatrics, University of Ioannina, Ioannina, Greece.
[5]Department of Pediatrics, University of Crete, Heraklion, Greece.
[6]3rd Department of Pediatrics, Aristotle University School of Medicine, Hippokration Hospital, Thessaloniki, Greece.
[7]1st Department of Pediatrics, University of Athens, Aghia Sophia Children's Hospital, Athens, Greece.

Authors' contributions

This work was carried out in collaboration between all authors. Authors HCM and MT performed the concept and design of study, interpretation of data, drafting the article, final approval. Authors DG, IG, NC, EG, AP, GS, ER and MT made acquisition and interpretation of data, drafting the article, final approval. Author PK made Statistical analysis, drafting the article, final approval. All authors read and approved the final manuscript.

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ABSTRACT

Aim: To study the experience of Greek pediatricians with parents who refuse their children's vaccination and their attitudes towards vaccinations.
Study Design: Nation-wide questionnaire-based survey conducted from February through May

**Corresponding author: Email: helen-maltezou@ath.forthnet.gr;*

2013.
Methodology: We included 211 pediatricians.
Results: A total of 190 (90%) pediatricians reported that they had encountered at least one case of parental vaccination refusal in the past. During 2012, the pediatricians faced a mean of 10.5 cases of vaccination refusals / 1000 vaccinations. The human papilloma virus (HPV) vaccine was the most frequently refused vaccine, followed by the measles-mumps-rubella (MMR) vaccine. "Fear of adverse effects" was the most frequent reason of vaccination refusal (83.8%) followed by "Use of alternative medicine" (46.4%) and "Anti-vaccination belief against all vaccines" (45.3%). Internet was the most frequent source of information for parents who refused vaccination. Of 201 pediatricians, 135 (67.2%) stated that "Childhood vaccinations should be mandatory for primary-school entry", while 28 (13.9%) stated that "Parents have the right to refuse their children's vaccinations". Lastly, 130 (61.6%) pediatricians stated that they had concerns about vaccines, mainly about their costs (46.2%).
Conclusion: Refusal of vaccinations by parents is not frequent in Greece and concerns mainly the HPV and the MMR vaccines. Pediatricians should improve their ability to deal with this issue.

Keywords: Children; parents; pediatricians; refusal; vaccinations.

1. INTRODUCTION

Vaccinations are among the most successful public health interventions in human history, resulting in elimination or control of several severe infectious diseases [1]. Nevertheless, vaccine-preventable diseases (VPDs) still remain an important public health issue even in countries with long-term established vaccination programs [2-5]. VPD outbreaks with deleterious consequences have been propagated by children or adolescents whose parents refused their vaccination sometime in the past, mainly because of vaccine safety concerns but also because of religious or philosophical beliefs [2,5,6]. Evidence suggests that vaccination refusal has increased during the past two decades. This is attributed to the absence of personal experience with most VPDs in the vaccine era, while Internet and alternative medicine also possess a central role in the dissemination of the arguments of the anti-vaccinationists [7-14]. Globally, there are very few studies addressing the experience of pediatricians with parents who refuse their children's vaccination [12,15,16].

In Greece anti-vaccination beliefs heightened during the 2009 influenza H1N1 pandemic, with only 3.2% of the general public being vaccinated against H1N1, despite the broad availability of the monovalent vaccines [17,18]. It is critical for vaccination policy makers to understand the reasons for vaccination refusal in order to respond appropriately and increase the capability of health-care professionals to deal with this phenomenon. The objectives of this nationwide study were: to estimate the experience of pediatricians with parents who refuse their children to be vaccinated in Greece; to identify the specific vaccines that are associated with parental refusal of vaccination and the reasons for that; and to investigate the pediatricians' attitudes towards vaccinations.

2. METHODOLOGY

In accordance with the 2012 National vaccination coverage study of children in Greece [19], 65-70% of all vaccine doses except the Bacillus Calmette-Guérin (BCG) vaccine are provided by private-practice pediatricians. A questionnaire was distributed to 900 of 1305 private-practice pediatricians who attended six major pediatric conferences in Greece during February-May 2013. Pediatricians were asked to complete the form only once. The following data were collected: demographics, area and years of practice, number of vaccines delivered weekly and number of cases of parental vaccination refusal encountered in total and by vaccine during 2012. The reasons of parental vaccination refusal and the paediatricians' attitudes about childhood vaccinations were asked. Parental vaccination refusal was defined as a parent who refuses his/her child vaccination with a vaccine in a specific visit for reasons other than medical and against the advice of the pediatrician. We defined the ratio of vaccination refusal (RVR) as: [number of cases of parental vaccination refusal faced by the pediatrician during 2012 / number of vaccines delivered weekly by the pediatrician x 52] x 1000. Finite population correction was used to estimate the 95% confidence interval (CI). The technique of Analysis of Variance tested the difference of the RVR among the regions. The

logistic regression investigated the association between the pediatricians' beliefs and attitudes and the pediatrician variables. The European Union first-level Nomenclature of Territorial Units for Statistics (NUTS) were used for coding the region of practice [20]. The National Vaccination Program of Greece includes the diphtheria-tetanus-acellular pertussis-inactivated poliomyelitis-*Haemophilus influenzae* type B (DTaP-IPV-HIb), measles-mumps-rubella (MMR), varicella, hepatitis A, hepatitis B, 10-valent or 13-valent conjugate pneumococcus, meningococcus serotype C, human papilloma virus (HPV), and BCG vaccines [21]. Vaccinations are not compulsory in Greece.

3. RESULTS AND DISCUSSION

A total of 219 pediatricians participated (24.3% response rate). Of them, 211 deliver vaccines and were analyzed (12.5% of the 1683 private-practice pediatricians in Greece). Most participants were >41 years old and females and worked in urban areas (75%, 65.8% and 89.8%, respectively). A mean of 23.4 years (range: 4-43) and 15.1 years (range: 0-39) had elapsed from acquisition of medical diploma and pediatric specialization, respectively. The mean number of vaccines given weekly was 30.3 (range: 1-250).

Of the 211 pediatricians, 190 (90%) had faced ≥ one case of parental vaccination refusal during their career. In 2012 alone, a mean number of 10.5 cases (range: 0-154) of vaccination refusal were seen per pediatrician. The mean and 95% CIs for the 2012 RVR was 10.5±3.0 [=7.5, 13.5], which provides a highly accurate estimation. Pediatricians in Attica and Crete-Aegean Islands faced more cases of vaccination refusal (mean number of cases: 14.6 (range: 0-154) and 13.7 (range: 0-154), respectively) compared with pediatricians in Central Greece and North Greece (mean number of cases: 6.7 (range: 0-48.1) and 8.2 (0-37.2), however this difference was not statistically significant.

Table 1 shows the cases of parental refusal of vaccination by vaccine. The HPV vaccine was the most frequently refused vaccine, followed by the MMR vaccine (58.8% and 56.9%, respectively); the mean number of cases of parental vaccination refusal ranged from 0.3 per 1000 vaccinations for the DTaP-IPV-Hib vaccine, the conjugate pneumococcus vaccine and the meningococcus type C vaccine to 4.6 cases per 1000 vaccinations for the HPV vaccine. Given that in Greece the HPV vaccine is recommended for girls only, we can estimate that the RVR in the eligible population of girls is approximately 8 per 1000 vaccinations.

Table 1. Number of pediatricians who encountered cases of parental refusal of vaccination in 2012 by vaccine

Vaccine	Number of pediatricians n = 211	Mean RVR* (range)
HPV	124 (58.8)	4.6 (0-75)
MMR	120 (56.9)	2.5 (0-120)
Varicella	74 (35.1)	1.3 (0-75)
Hepatitis A	43 (20.4)	0.7 (0-30)
Hepatitis B	43 (20.4)	0.5 (0-6)
DTaP-IPV-Hib	33 (15.6)	0.3 (0-6)
Pneumococcus	30 (14.2)	0.3 (0-6)
Meningococcus type C	30 (14.2)	0.3 (0-9)

RVR: ratio of vaccination refusal; HPV: human papilloma virus; MMR: measles-mumps-rubella; DTaP-IPV-Hib: Diphtheria-Tetanus-acellular Pertussis-inactivated Poliomyelitis-Haemophilus influenzae type b; pneumococcus: 10-valent or 13-valent conjugate pneumococcus vaccine
** per 1000 vaccinations*

Of the 190 pediatricians who had at least one case of parental vaccination refusal, 179 stated that the reason of vaccination refusal has been communicated to them by the parents. "Fear of adverse effects and concerns about the safety of a specific vaccine" was the prevalent reason of vaccination refusal (150 cases; 83.8%), followed by "Use of alternative medicine" (83 cases; 46.4%) and "Anti-vaccination belief against all vaccines" (81 cases; 45.3%). Internet was the most frequent source of information for vaccines for parents who refused vaccination (142 cases; 84.5%). In terms of the pediatricians' attitudes towards mandatory vaccinations, 135 (67.2%) of 201 pediatricians stated that "Childhood vaccinations should be mandatory for primary-school entry", while 28 (13.9%) stated that "Parents have the right to refuse their children's vaccinations". In terms of strategies to confront parental refusal of vaccination, 145 (68.7%) pediatricians believe that "They should spend more time to inform the parents about the safety and the expected benefits of vaccinations", 129 (61.1%) believe that "The Ministry of Heath should organize campaigns in order to disseminate messages and promote childhood vaccinations", and 81 (38.4%) believe that "Written declination statements should be requested by parents who refuse their children's vaccinations". Lastly, 130 (61.6%) of the 211 pediatricians stated that they have concerns about vaccines. The most frequent concern was the cost of vaccines (60 pediatricians; 46.2% of those who had any concern about vaccines),

whereas concerns about the safety of vaccines were reported by 41 pediatricians (31.5% of those who had any concern about vaccines; 19.4% of all participating pediatricians). No statistically significant association between the pediatricians characteristics and the statements "I am concerned about vaccines", "I am concerned about the safety of vaccines", "Vaccinations of children should be mandatory", "Parents have the right to refuse their children's vaccination" and "The anti-vaccination movement will increase the next years" was found (data not shown).

This is one of few studies conducted to explore the experience that pediatricians have on parental refusal of childhood vaccinations in Greece [12,15,16]. In this study 90% of pediatricians had encountered cases of vaccination refusal at least once during their career. This is similar with a 2007-2008 study from Connecticut, where 83% of 133 pediatricians reported parents who refused some vaccines [12]. In our study, a mean of 10.5 / 1000 vaccinations were refused by parents during 2012 alone, which in practice means that nowadays approximately 1 every 100 childhood vaccinations scheduled by private-practice pediatricians in Greece are refused by parents. This finding indicates that vaccination refusal is rare in Greece and it is in accordance with a survey conducted in six European countries in 2008, showing that 93% of 267 pediatricians who vaccinate in their offices estimated the vaccination refusal of all vaccines as <1%, while 47% of them estimated the magnitude of partial vaccination refusal as <1% and 38% as 1-5% [16]. In contrast, a 2002 nationwide survey in the United States showed that 54% of 302 pediatricians faced $\geq$ one case of total vaccination refusal during a 12-month period, while the respective percentage for partial vaccination refusal reached 85% [15]. Cultural differences, such as a belief in science, scientific literacy, and fear of disease, as well as differences in information may lead to differences in perceived risks of VPDs and the perceived safety and efficacy of vaccines, and thus may explain differences in vaccination acceptance among populations and communities. The vaccination program that is implemented in a country, the timing of a study, and physicians' quality and skills may also influence these findings. We believe that a belief in preventive medicine by parents in association with the personal approach and the time dedicated by private-practice pediatricians in Greece account for the rarity of parental vaccination refusal in this country.

In our study, the HPV vaccine was by far the most likely refused vaccine, followed by the MMR vaccine. Parental skepticism about the HPV vaccine emerged in several countries upon its inclusion in vaccination programs [22-24]. Reasons for HPV vaccination refusal include parental perception of vaccine safety, gaps in information about the HPV vaccine, general mistrust, cultural disparities, and high costs [23,24]. Similarly, the MMR vaccine was listed first in the list of the most refused vaccines in the European survey [16] and second only to influenza vaccine in the Connecticut study [12]. The safety of the MMR vaccine was questioned by the media in Europe in the past decade and led to the suboptimal childhood vaccination coverage in several communities [2,25,26]. Nowadays, almost four decades after the inclusion of the measles vaccine in vaccination programs in Europe, several countries faced large measles epidemics, with > 60,000 cases and several fatalities notified during 2010-2011 alone [2,27].

We found an excellent correlation between RVR and 2012 childhood vaccination coverage in Greece for the vaccines that were included in the National Vaccination Program before 2000. In particular, vaccination coverage with 2 doses of the MMR vaccine was 83%, while those for the DTP-aP-IPV (4 doses) and hepatitis B vaccines (3 doses) were 99% and 98%, respectively [19]. Good correlation was also found for the newer vaccines, e.g. varicella vaccine (74% vaccination coverage with 2 doses), hepatitis A vaccine (82% vaccination coverage with 2 doses), and meningococcus type C vaccine (86% vaccination coverage with 1 dose $\geq$12 months old) [21]. Data about uptake of the HPV vaccine by girls in Greece are not available. The RVR can be used in order to compare results between populations and communities. However, vaccination refusal in the office does not exactly equate to immunization rates in general. The possible correlation between the RVR and the vaccination coverage for a specific VPD in a specific community needs to be further investigated.

In accordance with others [15,16], "Fear of adverse effects and concerns about the safety of specific vaccines" was the most common reason of parental vaccination refusal, accounting for four in five cases. In addition, one in five pediatricians stated that they are concerned about the safety of vaccines, which is important

given their critical role as a trusted authority for the delivery of information and decision making of parents [28,29]. Concerns about the cost of vaccines were the most frequent concerns in our study and may be related to the perceived high ratio of cost versus return compared to the rarity of some, although fatal, VPDs. Currently the vaccines included in the Greek vaccination program are 100% reimbursed however, given the economic crisis, financial issues may emerge in the future. Two thirds of pediatricians supported mandatory childhood vaccinations. A similar rate of acceptance (74.4%) was reported by Italian healthcare workers [30]. In our study, a non-negligible number (13.9%) believe that parents have the right to refuse their children vaccinations.

Our study has few limitations. First, there was a 24.3% response rate. It is possible that participating pediatricians are more sensitive to vaccinations. However we studied a sizeable sample of vaccine-providing pediatricians in Greece which could be considered representative. Second, we did not record the experience of pediatricians in public health-care facilities, where approximately one third of all vaccines are given. Third, the possibility of a pediatrician completing more than one survey by attending more than one conference cannot be completely ruled out. Recall bias is also a possibility. The main advantage of this study is the nationwide enrollment of a good sample of vaccine-providers. We developed the RVR which allowed us to quantify the pediatricians experience with vaccination refusal.

4. CONCLUSION

Our study offers insight in parental vaccination refusal. In Greece vaccination refusal is a rare event, concerning one every 100 vaccinations delivered by private-practice pediatricians. In this setting, vaccination refusal concerns mainly the HPV and the MMR vaccines. Given the current epidemiological trends, efforts should be placed in order to improve the ability of health-care professionals to deal with this issue and achieve high vaccination coverage in the pediatric population.

CONSENT

Not applicable.

ETHICAL APPROVAL

Not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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