EBioMedicine 2 (2015) 891–897

Contents lists available at ScienceDirect

EBioMedicine

journal homepage: www.ebiomedicine.com

Original Article

Vaccine Hesitancy Among General Practitioners and Its Determinants During Controversies: A National Cross-sectional Survey in France

Pierre Verger [a,b,c,d,*], Lisa Fressard [a,b,c], Fanny Collange [a,b,c], Arnaud Gautier [e], Christine Jestin [e], Odile Launay [d,f], Jocelyn Raude [g], Céline Pulcini [h,i], Patrick Peretti-Watel [a,b,c]

[a] INSERM, UMR912 "Economics and Social Sciences Applied to Health & Analysis of Medical Information" (SESSTIM), 23 rue Stanislas Torrents, 13006 Marseille, France
[b] ORS PACA, Southeastern Health Regional Observatory, 23 rue Stanislas Torrents, 13006 Marseille, France
[c] Aix Marseille University, IRD, UMR-S912, 58 bd Charles Livon, 13284 Marseille Cedex 07, France
[d] INSERM, F-CRIN, Innovative Clinical Research Network in Vaccinology (I-REIVAC), GH Cochin Broca Hôtel Dieu, 27 rue du Faubourg Saint-Jacques, 75014 Paris, France
[e] Institut national de prévention et d'éducation pour la santé, 42 boulevard de la Libération, 93203 Saint Denis Cedex, France
[f] Université Paris Descartes, Sorbonne Paris Cité, Assistance Publique Hôpitaux de Paris, Hôpital Cochin, INSERM CIC 1417, 27 rue du Faubourg Saint-Jacques, 75014 Paris, France
[g] EHESP Rennes, Sorbonne Paris Cité, avenue du Professeur Léon-Bernard, 35043 Rennes, France
[h] Université de Lorraine, Université Paris Descartes, EA 4360 APEMAC, 34 Cours Léopold, 54000 Nancy, France
[i] CHU de Nancy, Service de Maladies Infectieuses, 29 Avenue du Maréchal de Lattre de Tassigny, 54035 Nancy cedex, France

ARTICLE INFO

Article history:
Received 9 June 2015
Received in revised form 18 June 2015
Accepted 19 June 2015
Available online 23 June 2015

Keywords:
Vaccine hesitancy
General practitioners
Private practice
Attitudes of health personnel
Adverse effects
Trust

ABSTRACT

Background: This study aimed to assess: 1) vaccine hesitancy (VH) prevalence among French general practitioners (GPs) through the frequency of their vaccine recommendations, and 2) the determinants of these recommendations.
Methods: Cross-sectional observational study in 2014 nested in a national panel of 1712 randomly selected GPs in private practice in France. We constructed a score of self-reported recommendation frequency for 6 specific vaccines to target populations.
Results: 16% to 43% of GPs sometimes or never recommended at least one specific vaccine to their target patients. Multivariable logistic regressions of the dichotomized score showed that GPs recommended vaccines frequently when they felt comfortable explaining their benefits and risks to patients (OR = 1.87; 1.35–2.59), or trusted official sources of information highly (OR = 1.40; 1.01–1.93). They recommended vaccines infrequently when they considered that adverse effects were likely (OR = 0.71; 0.52–0.96) or doubted the vaccine's utility (OR = 0.21; 0.15–0.29).
Interpretation: Our findings show that after repeated vaccine controversies in France, some VH exists among French GPs, whose recommendation behaviors depend on their trust in authorities, their perception of the utility and risks of vaccines, and their comfort in explaining them. Further research is needed to confirm these results among health care workers in other countries.

1. Introduction

Over the past two decades several vaccine controversies have emerged in various countries, including France, inducing worries about severe adverse effects and eroding confidence in health authorities, experts, and science (Larson et al., 2011). These two dimensions are at the core of the vaccine hesitancy (VH) observed in the general population. VH is defined as delay in acceptance of vaccination, or refusal, or even acceptance with doubts about its safety and benefits, with all these behaviors and attitudes varying according to context, vaccine, and personal profile, despite the availability of vaccine services (SAGE Group 2014) (Larson et al., 2014; Dubé et al., 2013). VH presents a challenge to physicians who must address their patients' concerns about vaccines and ensure satisfactory vaccination coverage.

Physicians, and especially general practitioners (GPs), are the cornerstone of vaccination implementation in most countries and their recommendations play an influential role in their patients' vaccine behavior (Gust et al., 2008; Freed et al., 2011; Schwarzinger et al., 2010). In France, GPs write prescriptions for 90% of the vaccinations purchased. Patients may return to the GP for administration after purchasing the vaccine, but they may also see a nurse or make other arrangements or fail to follow up (Ecole des Hautes Etudes en Santé Publique, 2013). Although physicians are generally favorable to vaccination, some, especially those whose practice includes but is not limited to homeopathy or acupuncture, are known to be negative toward vaccination in general or toward some particular vaccines (Benin et al., 2006; Pulcini et al., 2013;

* Corresponding author at: Observatoire Régional de la santé, 23 rue Stanislas Torrents, 13006 Marseille, France.
E-mail address: pierre.verger@inserm.fr (P. Verger).

http://dx.doi.org/10.1016/j.ebiom.2015.06.018

François et al., 2011). Moreover, the percentage of physicians reporting doubts about the harmlessness of vaccines is growing (Dubé et al., 2013). Physicians may therefore share some of the same questions and concerns expressed by the general population (Poland, 2010) and distrust health authorities, just as the population does (Yaqub et al., 2014). These findings raise the question of whether doubts about vaccine safety and distrust of the health authorities might fuel VH among physicians. Vaccine-hesitant physicians are likely to recommend vaccines to their patients at lower rates and with less conviction than nonhesitant physicians (Dubé et al., 2013; Bean and Catania, 2013).

As part of a national panel of 1712 GPs in private practice in France, we conducted a study of this topic with two main objectives. First, we sought to assess the presence, extent, and variability of VH among French GPs, in relation to six vaccine situations (specific vaccine and target population) with suboptimal vaccination coverage: we assessed their VH through their self-reported recommendation behavior. Second, we sought to test factors associated with GPs' vaccine recommendations, after verifying that their recommendations were correlated to their own vaccination behavior. Several specific vaccines are or have been controversial in France: questions have been raised about the safety and benefits of vaccines against hepatitis B, HPV and seasonal influenza, as well as against adjuvants (Appendix, Table A1), and about the reliability of the information disseminated by health authorities about them. Other vaccines remain uncontroversial, including MMR (perhaps surprisingly) and the vaccine against meningococcal meningitis C. We expected that GPs' beliefs about vaccine utility in general and their self-efficacy — beliefs in their ability to convince patients to be vaccinated (Bandura, 1994) — would be positively correlated to their recommendation of all vaccines, either controversial or not (hypothesis 1). On the other hand, we also expected that GPs' beliefs about vaccine safety and trust in health authorities would be negatively correlated to their recommendations for controversial, but not for uncontroversial, vaccines (hypothesis 2).

2. Methods

2.1. Population

The panel was designed to collect data regularly about GPs' medical practices, working conditions, and opinions about public health regulatory policies and was set up following the methods used for a previous panel (Verger et al., 2012). Enrolment took place between November 2013 and March 2014: we selected GPs in private practice (non-salaried) by random sampling from the Ministry of Health's exhaustive database of health professionals in France ("Répertoire Partagé des Professionnels de Santé"). Sampling was stratified for sex, age (tertiles in the sampling base: <50, 50–58, >58 years), and annual number of office consultations and house calls (workload), obtained from the exhaustive reimbursement database of the National Health Insurance Fund for each GP in 2012. Sampling was also stratified for the density of each GP's municipality of practice. The sample size was set so that the smallest stratum resulting contained at least 10 GPs. Agreement to participate in the panel meant agreeing to respond to a cross-sectional survey every six months for two and a half years. GPs planning to retire within 6 months or who practiced acupuncture or homeopathy or other alternative medicine exclusively were excluded. To limit any selection bias that might have resulted from particular opinions or attitudes, the specific topics to be studied were not mentioned to GPs before they were asked to participate. The National Authority for Statistical Information (Commission Nationale de l'Information Statistique) approved the panel.

The first cross-sectional survey in this panel focused on vaccination behaviors and attitudes and took place from April to July 2014. GPs received a compensation equivalent to one consultation fee for their participation in this survey.

2.2. Procedure and Questionnaires

Professional investigators first contacted GPs to ask them to participate, obtain their consent, and verify inclusion criteria; they then conducted the inclusion interview, with computer-assisted telephone interview (CATI) software. The interview included a short standardized questionnaire collecting information about participants' professional characteristics (Table 1). In the second step, participants received written consent forms to return to us.

We developed a standardized questionnaire for the first cross-sectional interview after reviewing the literature, conducting qualitative interviews on the topic with 10 GPs, and discussing it with experts. We pilot-tested the questionnaire for clarity, length, and face validity among 50 GPs and modified several questions found to be unclear.

As summarized in Table 2, the questionnaire collected information about: 1) the frequency at which GPs recommended vaccines in six specific situations, chosen because their current coverage in France does not meet official objectives; 2) GPs' opinions about the likelihood of links between potential severe adverse effects and certain vaccines or vaccine components (adjuvants) that have been or still are the subject of public and/or scientific debate in France or elsewhere (six items); 3) GPs' beliefs about the utility of vaccines; 4) GPs' confidence in their

Table 1
Social, demographic, and professional characteristics of the study population (French nationwide panel of general practitioners, unweighted data).

No. (%)	Refusals (n = 2012)	Panel participants (n = 1712)[a]	Survey participants (n = 1582)
Stratification variables			
Gender			
Male	1482 (73.7)	1100 (64.3[b])	1014 (64.1)
Female	530 (26.3)	612 (35.7)	568 (35.9)
Age — years			
<50	559 (27.8)	618 (36.1[b])	580 (36.7)
50–58	732 (36.4)	622 (36.3)	573 (36.2)
>58	721 (35.8)	472 (27.6)	429 (27.1)
GPs density of the municipality of practice			
<− 19.3% of national average	601 (29.9)	511 (29.8)	474 (30.0)
Between − 19.3% and + 17.7% of national average	957 (47.5)	818 (47.8)	753 (47.6)
>+17.7% of national average	454 (22.6)	383 (22.4)	355 (22.4)
2012 workload			
<3067 procedures	369 (18.3)	349 (20.4[c])	318 (20.1)
3067–6028 procedures	953 (47.4)	854 (49.9)	793 (50.1)
>6028 procedures	690 (34.3)	509 (29.7)	471 (29.8)
Practice population characteristics[d]			
Proportion of patients aged under 16 (%)			
[0–16]	–	371 (23.9)	333 (23.3)
[17–21]	–	387 (24.9)	353 (24.7)
[22–25]	–	402 (25.9)	380 (26.6)
[26–50]	–	393 (25.3)	364 (25.5)
Proportion of patients aged over 70 (%)			
[0–8]	–	459 (29.6)	422 (29.5)
[9–12]	–	391 (25.2)	361 (25.2)
[13–17]	–	361 (23.3)	335 (23.4)
[18–67]	–	342 (22.0)	312 (21.8)
Professional characteristics			
Practice			
Group	–	1002 (58.5)	929 (58.7)
Solo	–	710 (41.5)	653 (41.3)
Occasional practice of alternative medicine[e]			
No	–	1511 (88.3)	1403 (88.7)
Yes	–	201 (11.7)	179 (11.3)

[a] Chi-square test: refusals vs participants in the panel.
[b] $P \leq .001$.
[c] $P \leq .05$.
[d] Quartiles; 159 missing values.
[e] Alternative medicine: homeopathy and/or acupuncture.