Vaccine 32 (2014) 4386–4392

Contents lists available at ScienceDirect

Vaccine

journal homepage: www.elsevier.com/locate/vaccine

Comparison of self-report influenza vaccination coverage with data from a population based computerized vaccination registry and factors associated with discordance

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ARTICLE INFO

Article history:
Received 15 April 2014
Received in revised form 27 May 2014
Accepted 13 June 2014
Available online 23 June 2014

Keywords:
Influenza
Vaccines
Coverage
Self-report
Registries

ABSTRACT

Objectives: We aim to compare influenza vaccination coverages obtained using two different methods; a population based computerized vaccination registry and self-reported influenza vaccination status as captured by a population survey.
Methods: The study was conducted in the Autonomous Community of Madrid (ACM), Spain, and refers to the 2011/12 influenza vaccination campaign.

Information on influenza vaccination status according to a computerized registry was extracted from the SISPAL database and crossed with the electronic clinical records in primary care (ECRPC). Self-reported vaccine uptake was obtained from subjects living in the ACM included in the 2011–12 Spanish National Health Survey (SNHS). Independent study variables included: age, sex, immigrant status and the presence of high risk chronic conditions. Vaccination coverages were calculated according to study variables. Crude and adjusted prevalence ratios were computed to assess concordance.
Results: The study population included 5,245,238 adults living in the ACM in year 2011 with an individual ECRPC and 1449 adult living the ACM and interviewed in the SNHS from October 2011 to June 2012.

The weighted vaccination coverage for the study population according to self-reported data was 19.77% and 15.04% from computerized registries resulting in a crude prevalence ratio (cPR) of 1.31 (95% CI 1.20–1.44) so self-reported data significantly overestimated 31% the registry coverage. Self-reported coverages are always higher than registry based coverages when the study population is stratified by the study variables. Self-reported overestimation was higher among men than women, younger age groups, immigrants and those without chronic conditions. Both methods provide the most concordant estimations for the target population of the influenza vaccine.
Conclusions: Self-report influenza vaccination uptake overestimates vaccination registries coverages. The validity of self-report seems to be negatively affected by socio-demographic variables and the absence of chronic conditions. Possible strategies must be considered and implemented to improve both coverage estimation methods.

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http://dx.doi.org/10.1016/j.vaccine.2014.06.074
0264-410X/

1. Introduction

National and regional immunization programs rely on continued vigilance to ensure safety and effectiveness of vaccines and to assess compliance [1–4]. This is particularly important in the case of influenza, as the vaccine has to be administered every year, for each influenza strain [1–4].

Monitoring vaccination uptake for seasonal influenza, especially among high-risk groups then becomes an important public health activity [1,2,4,5]. Furthermore, observational studies of influenza vaccine effectiveness and safety depend on accurate ascertainment of influenza vaccination status in the study population [4–7]. Potential sources of data for vaccine coverage include self-report, medical records and immunization registries [2,5–18].

Self-reported influenza vaccination status, usually collected in large population based health surveys, is commonly used to estimate vaccine coverage and to determine vaccine effectiveness [2,5,7–9]. Llupià et al. conducted a review, including eight studies comparing self-report with vaccination records among high-risk patients in whom influenza vaccination was recommended. The authors concluded that self-reported coverage is a good proxy but tends to overestimate the coverage calculated from the vaccination record [10].

Current development of technology and information systems has enabled the creation of population-based electronic immunization registries [2,17,18]. In Europe, by year 2011, four countries reported that they had an immunization registry at national level and six countries have immunization registries at sub-national level [2,18]. As these registries reach the whole population, this information source could have methodological advantages over traditional methods to calculate vaccination coverage and to conduct vaccine effectiveness studies [6,17,18]. However, before relying on registry data for a vaccine effectiveness study, evaluation of the registry's population coverage and data quality is necessary [6,17].

In 2006, a population-based computerized immunization registry, namely the Food and Public Health Information System (SISPAL) was implemented in the Autonomous Community of Madrid (ACM), Spain [19]. The ACM is a region in the center of Spain with a population of almost 6.5 million in 2011. In the ACM the anti-influenza vaccination is recommended every year to all people aged 60 or above and people under 60 with high-risk chronic conditions [19–21]. Vaccination is administered free of charge to all recommended groups in public health centers, but vaccination is not routinely provided to hospitalized patients [19–21]. When the patient is discharged from the hospital is send to his primary health care center for vaccination. In exceptional circumstances, such as high risk patients who are expected to be hospitalized for a long period, the Preventive Medicine Service is responsible for the in-hospital patient's vaccination. Also if a nosocomial outbreak of influenza is detected high risk patients are vaccinated. Health care workers (HCWs) are offered the vaccine by the occupational health units in the health centers they work at. Beside HCWs, caregivers of persons with medical conditions that put them at higher risk for severe complications from influenza and people who provide essential public services (policemen, firemen) are also included in the recommended groups [19–21].

The objectives of this study were to compare the coverages of influenza vaccination obtained using two different methods; a population based computerized vaccination registry and a self-reported influenza vaccination status as captured by a population survey. This information was used to determine the extent of concordance and factors associated with the differences observed.

2. Materials and methods

The study population comprised all residents aged 15 years or over registered in the public health system of the ACM, Spain.

We used a cross-sectional design with three information sources: (1) Electronic clinical records in primary care (ECRPC). (2) The ACM population based computerized immunization registry, namely SISPAL. (3) Individual self reported data of people living in the ACM included in the 2011–12 Spanish National Health Survey (SNHS).

The detailed methodologies of these information sources are described elsewhere [19–22].

This study refers to the 2011/12 influenza vaccination campaign which lasted from 1 October to 31 December 2011 [20].

Information on influenza vaccination status according to a computerized registry was extracted from the SISPAL database that provides nominal records of the influenza vaccination administered in either public or private health services of the entire population living in the ACM [19].

Self-reported vaccine uptake data was obtained from the SNHS that collects vaccine uptake with the question "Did you have a flu shot during the latest influenza vaccination campaign?" To determine the influenza campaign we used the date the subject was interviewed. So individuals interviewed before October 2011 were considered vaccinated in the previous campaign (2010/11) and excluded. Therefore, only those living in the ACM and interviewed from October 2011 to June 2012 were included in the investigation ($N = 1449$).

The independent study variables included age, sex, immigrant status (yes/no) and the presence of high risk chronic conditions (cardiovascular disease, respiratory disease, diabetes or cancer) that constitute an indication for the anti-influenza vaccination in the ACM [20].

Information on these variables from computerized registries was obtained by merging the SISPAL database with the individual records included in the ECRPC for all patients aged 15 year or over living in the CAM. The ECRPC includes codes according to the International Classification for Primary Care (ICPC) so we can identify subjects suffering the high risk chronic conditions of interest for our investigation [23]. The codes common to the SISPAL and the ECRPC (needed to merge both databases), were the medical card identification number, name, surname, date of birth, and sex.

Information on high risk conditions obtained from the SNHS 2011 is self-reported using the question "Has your physician told you that you currently suffer any of the following chronic diseases?"

2.1. Statistical analysis

A descriptive analysis was performed by calculating the distribution of the study population and influenza vaccination coverage obtained from the computerized registries and from the population survey according to the study variables.

The distribution and coverages from the SNHS data for the ACM were obtained by multiplying the observed values by the adjustment weights provided in the database. These weights are calculated to take into account survey non-response, oversampling, post-stratification, and sampling error [22].

We estimated crude prevalence ratios by dividing the prevalence estimated from the SNHS by the prevalence observed obtained from the ECRPC.

We calculated the differences in vaccination coverage between the two methods by subtracting the coverage observed by computerized registries to that obtained by self-report. These differences are also expressed as prevalence ratios.

Finally, multivariate binomial lineal regression models, adjusted by age and sex, were conducted to calculate adjusted prevalence