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Factors associated to repeated influenza vaccination in the Portuguese adults with chronic conditions

Ausenda Machado^{a,b,*}, Irina Kislaya^{a,b}, Ana João Santos^a, Vânia Gaio^{a,b}, Ana Paula Gil^{a,c}, Marta Barreto^{a,b}, Sónia Namorado^{a,b}, Liliana Antunes^a, Carlos Matias Dias^{a,b}, Baltazar Nunes^{a,b}

^a Department of Epidemiology, National Institute of Health Doutor Ricardo Jorge, Lisboa, Portugal

^b Centro de Investigação em Saúde Pública, Escola Nacional de Saúde Pública, Universidade NOVA de Lisboa, Lisboa, Portugal

^c CICS.NOVA-Interdisciplinary Centre of Social Sciences – Faculty of Social Sciences and Humanities FCSH/NOVA, Portugal

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ABSTRACT

Annual influenza vaccination is recommended to people with chronic conditions. This study aimed to estimate the proportion of chronically ill adults vaccinated against influenza in consecutive seasons and to identify associated factors.

We used data from the first National Health Examination Survey (INSEF), a cross-sectional study conducted in 2015 on a probabilistic sample of individuals aged 25–74 years. The population was restricted to individuals who self-reported diabetes, a respiratory, cardiovascular, liver or kidney disease. Self-reported vaccination in 4 consecutive seasons was categorized in 3 levels: unvaccinated, occasionally (vaccinated 1–3 seasons) and repeatedly vaccinated (in all 4 seasons). A multinomial logistic regression was applied to estimate odds-ratio (OR) of influenza vaccination according to sociodemographic factors, chronic condition, health care use and status.

In the target population, the 2014/15 influenza vaccine coverage was 33.8% (95% CI: 29.8–38.1). The higher coverage was found in individuals reporting renal disease (66.7%) and diabetes (43.8%). The coverage decreased to 32.6%, 26.0% and 20.8% for individuals with respiratory, cardiovascular and liver diseases, respectively. The probability of being repeatedly vaccinated, compared to unvaccinated, was higher in males (OR = 2.14; 95% CI: 1.31–3.52); aged 65 and 74 (OR = 4.39; 95% CI: 1.99–9.69); whom had an appointment with a general practitioner (OR = 2.77; 95% CI: 1.00–7.66) or other physician (OR = 3.95; 95% CI: 2.53–6.16); with no smoking habits (OR = 1.58; 95% I: 1.02–2.46) and reporting diabetes (OR = 2.13; 95% CI: 1.02–4.45). Finally, having a self-reported cardiovascular condition decreased the likelihood of being occasionally (OR = 0.38; 95% CI = 0.22–0.65) vaccinated against influenza.

Younger individuals, females and the ones with a self-reported cardiovascular condition were identified as more likely of non-compliance to the vaccine uptake recommendation. Future vaccination strategies should focus on the previous identified population subgroups. Also, the medical recommendation of the influenza vaccine uptake should continue and be reinforced particularly in individuals with a cardiovascular condition.

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1. Introduction

Seasonal influenza virus circulation is associated with an increased burden of hospitalization and mortality. In Portugal, influenza epidemics have been associated with an excess death of 24.7/100,000 inhabitants and an excess pneumonia and influenza hospitalization of 19.4/100,000 [1,2]. The impact of influenza is particularly severe in subgroups of the population with

increased risk of complications after an influenza infection. This includes, among others, individuals with chronic conditions [3].

For the past seasons, seasonal influenza vaccine has been described to be moderately effective in reducing medical consultation due to influenza [4] and hospitalizations [5,6]. On the other hand monovalent pandemic vaccine was considered to be highly effective against Influenza A(H1N1)pdm09virus [7–9]. There has been some debate on the effect of previous and repeated vaccination on the vaccine effectiveness in a given year [10], however the majority of evidence still sustains the benefit of vaccination when compared to no vaccination against influenza [11–13]. Given the evidence collected both in clinical trials

* Corresponding author at: Department of epidemiology, Instituto Nacional de Saúde Doutor Ricardo Jorge, Av. Padre Cruz, 1649-016 Lisbon, Portugal.

E-mail address: ausenda.machado@insa.min-saude.pt (A. Machado).

and observational studies, immunization against influenza is considered the most important public health intervention to reduce seasonal and pandemic influenza and its associated complications in the high-risk individuals [3].

Considering this and following the World Health Organization recommendation, in Portugal the annual vaccination against seasonal influenza has targeted those with 65 or more years and individuals with chronic respiratory, cardiovascular, renal, kidney and neuromuscular diseases and diabetes [14]. The seasonal influenza vaccine campaign starts in October, but individuals are recommended to have the vaccine along the autumn/ winter period. Vaccine uptake can take place in the health centre and since 2012 also at the pharmacy. There are no incentive for the health professional that prescribes the vaccine but some health centre units can be evaluated considering the coverage achieved in the population under its catchment area. Specific measures to increase the immunization uptake through vaccination have been implemented for these target groups, in addition to the usual media and internet vaccine promoting campaigns. This included offering the vaccine free of charge for the elderly since 2012, reducing the vaccine price for individuals with some chronic condition and the possibility of getting the vaccine not only in health centers but also in community pharmacies [15]. Despite these measures, the vaccine coverage in the elderly living in the community, estimated to be 50.1% in the 2015/16 season, was below the national established target of 60% [16,17]. In the group with chronic conditions, the influenza vaccine coverage was even lower and only 30.5% of individuals in this group reported taking the influenza vaccine in the 2015/16 season [17]. Specific research studies are thus needed to identify and evaluate factors that promote influenza vaccine uptake. A study conducted in 2013 in the mainland Portuguese population found that, for individuals belonging to the risk group recommended for vaccination, the lack of awareness of complications and fear of adverse vaccine effects were the main reasons for not being vaccinated [18].

To achieve the target established by the European commission of reaching 75% of vaccine coverage on this group by year 2014 [19], there is still a long way to go, and this reflects one aspect of the problem, given that an adequate preventive care requires elevated levels of influenza vaccine uptake every year.

At the moment in Portugal, the proportion of adults with chronic conditions that take the vaccine in a yearly basis, i.e., regular vaccination, is unknown. Also, there is lack of information on factors that could promote adequate yearly influenza vaccination. In this context and for a given season, predictors of vaccine uptake in adults with chronic conditions usually include older age, high education and income, use of health care services and having comorbidities [20–22]. Identifying factors related to regular influenza vaccine uptake would be important for developing effective strategies to overcome barriers to vaccination.

This study intends to estimate the proportion of vaccinated adults aged 25–74 years with chronic conditions in the Portuguese population for four consecutive seasons and to identify factors associated with repeated seasonal influenza vaccination uptake in this risk-group for influenza.

2. Methods

This study was developed as secondary analysis of data from the first Portuguese National Health Examination Survey (INSEF) conducted during February to December 2015 by the National Health Institute Doutor Ricardo Jorge in collaboration with the five Regional Health Administrations and the Regional Health Secretariats of the Autonomous Regions of Azores and Madeira and the Norwegian Institute of Public Health [23]. INSEF was a cross-sectional epidemiological study developed on a nationally representative probabilis-

tic sample of 4911 non-institutionalized individuals aged 25–74 years. INSEF sample was based on a two-stage stratified cluster design. Data on social and demographic conditions, vaccine uptake, health status, health determinants and health care use were collected by face to face with 74 trained interviewers using Computer Assisted Personal Interviews (CAPI). The Survey received ethical approval from the Ethics Committee of the Portuguese National Health Institute Doutor Ricardo Jorge, the National Data Protection Commission/Authority and the ethics committees of all national project partners. Detailed information on INSEF sampling and implementation is provided elsewhere [23,24].

For this study the target population included individuals who self-reported to have at least one of the following chronic conditions for which the influenza vaccine is recommended: asthma; chronic obstructive pulmonary disease; diabetes; cardiovascular (including stroke, myocardial infarction and arrhythmia); liver and kidney disease. Individuals were considered to have self-reported condition if they answered positively to both of respective questions: “Do you have any of the following diseases or conditions (list of diseases)? (Yes/No)” and “Were these conditions diagnosed by a medical doctor? (Yes/No)”. Individuals were considered in the study if the reported date of diagnosis was before 2011, and thus considered in the risk group for the 4 seasons in analysis (2011/12–2014/15).

Influenza vaccine uptake was ascertained through the question “did you have an influenza vaccine shot in the 2014/2015 winter?” combined with the questions “in the previous 3 winters did you have an influenza vaccine shot?” (yes in all winters, in one or two winters or not vaccinated). Self-reported vaccination status of respondents in four consecutive seasons was categorized in 3 levels: unvaccinated (unvaccinated in all 4 seasons), occasional (vaccinated in 1–3 seasons) and repeated (vaccinated in all 4 seasons).

Counts and percentages were used to describe study participants. Overall seasonal influenza vaccine coverage in 2014/15 season was estimated in addition to coverage by specific chronic condition.

We evaluated the following variables as independent factors: age, sex, marital status, cohabitation, education, self-reported tobacco smoking, general practitioner or other medical specialist visits in the 12 months previous to the interview and specific chronic conditions were tested for their relation with the influenza vaccine uptake (repeated or occasional). These were described in previous studies as being associated with influenza vaccine uptake by adults with chronic conditions.

We used a design-adjusted Rao–Scott version of Pearson’s chi-square test [25] to examine the association between the influenza vaccination status and the independent factors.

A multinomial logistic regression model was used to estimate adjusted odds ratios (OR) of repeated and occasional influenza vaccination against non-vaccinated in the four seasons, according to listed independent factors. All variables were included in the final model, except for cohabitation (for the collinearity with marital status) and renal and hepatic diseases (due to small number of cases that caused numerical problems in the model). All estimates were weighted to account for different selection probabilities that resulted from the complex sample design and to match the distribution of Portuguese resident population in terms of geographic region, age group and sex. Data analysis was carried out using [SVY] package of Stata 15.1® software [26] and 95% confidence intervals were computed.

3. Results

From the total INSEF sample (n = 4911), 807 participants (corresponding to a weighted number of 1,039,577 individuals; 95% CI:

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