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Visualizing knowledge and attitude factors related to influenza vaccination of physicians

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ABSTRACT

Purpose: To characterize groups of primary healthcare physicians according to sociodemographic data, years of professional experience and knowledge of and attitudes to influenza, and to evaluate differences between groups with respect to influenza vaccination in the 2011–2012 season.
Methods: We carried out an anonymous web survey of Spanish primary healthcare physicians in 2012. Information on vaccination, and knowledge of and attitudes to influenza was collected. Multiple correspondence analysis and cluster analysis were used to define groups of physicians.
Results: We included 835 physicians and identified three types. Type B were physicians with low professional experience of influenza. Types A and C were physicians with high professional experience with influenza, type A also had a high awareness of influenza and seasonal vaccination. Types A and C were older and more often male than type B ($p < 0.0001$). Knowledge of influenza was greatest in type A and lowest in type B. Awareness of influenza was greatest in type A and lowest in type C. In type A, 71.0% of physicians were vaccinated in the 2011–2012 season, compared with 48.1% and 33.6% from types B and C, respectively ($p < 0.001$).
Conclusions: Additional efforts should be made to increase interest and concerns about preventing the transmission of influenza in physicians who do not believe influenza is a severe disease and are not concerned about its transmission.

1. Introduction

Influenza is a highly-contagious disease that causes significant morbidity and mortality in the community [1]. Healthcare workers (HCW) are exposed to patients with influenza in the workplace and, consequently, are at risk of acquiring the disease and may act as vectors for nosocomial transmission. Because up to 25% of unimmunized HCW may develop influenza during the winter months, infected HCW may introduce infection into a healthcare facility [2,3].

HCW infected by patients are a frequent source of secondary transmission of influenza to patients and other HCW [4–6]. In addition, acquisition of influenza by HCW may cause absenteeism and disruption of health care [5,7]. Studies have shown that influenza

Abbreviations: CA, cluster analysis; FA, factor analysis; HCW, healthcare workers; MCA, multiple correspondence analysis.

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vaccination of HCW protects against various outcomes, including laboratory-confirmed influenza and work absenteeism [8–10] and may reduce morbidity and mortality in their patients [11–13]. Therefore, annual vaccination of HCW is considered the main preventive measure against the nosocomial transmission of influenza.

The United States Centers for Disease Control and Prevention recommend influenza vaccination of all hospital and outpatient HCW as a core strategy to prevent influenza transmission in healthcare centers [14]. In Spain, influenza vaccination is recommended and offered voluntarily and free-of-charge to all HCW, although coverages rarely reach 50% [15–18].

Primary healthcare physicians play a crucial role in influenza prevention as they attend the vast majority of patients with influenza and have a very important role in vaccinating patients [19,20]. Physicians' awareness of and agreement with official recommendations on influenza vaccination has been associated with higher immunization coverages in the general population, including high risk groups [21]. Therefore, it is important to understand the issues that affect physicians' acceptance of influenza vaccination.

To our knowledge, there are no studies aimed at identifying of primary healthcare physicians according to their knowledge of and attitudes to influenza vaccination. Classifying physicians into subtypes could help improve vaccination coverages and support specific interventions. The aim of this study was to characterize primary healthcare physicians according to their similarities with respect to sociodemographic data, professional experience, and knowledge of and attitudes to influenza vaccination, using a combination of multiple correspondence analysis and cluster analysis. Once the groups were characterized, we validated them by assessing their relationships with key outcomes, such as influenza vaccination in the 2011–2012 season.

2. Methods

A cross-sectional study was made by administering a questionnaire to primary healthcare physicians from seven Spanish regions (Andalusia, Castile-Leon, Catalonia, Valencia, Madrid, Navarre and the Basque Country), which represent 70% of the Spanish population. The questionnaire was conducted anonymously between March 1 and May 25, 2012 via the internet.

2.1. Study subjects

The target population was any primary healthcare family physician providing direct patient care. Participating centers were randomly selected in each region from a list of primary healthcare centers. All physicians in these centers with an email address were included. The questionnaire was accessible for a month and an email reminder was sent every 10 days to physicians who had not accessed the questionnaire.

2.2. Variables

The questionnaire was developed after a review of the scientific literature, and, especially, the questionnaire used in the study by Kraut et al. [24]. The questions were adapted to the specific circumstances of the Spanish National Health System and two pilot tests were conducted in the researchers' settings to validate understanding of the questionnaire and its length.

The following sociodemographic and professional variables were collected: age, sex, years of professional experience, participation in the influenza sentinel surveillance network (network of family physicians who collect demographic information on the vaccination status and samples from nasopharyngeal swabs of patients with influenza-like illness), and type of population (rural and intermediate ≤10,000 inhabitants and urban >10,000 inhabitants [25]). We also collected the presence of risk conditions for influenza and contraindications to influenza vaccination in each physician, and information on knowledge of and attitudes to influenza and influenza vaccination in the 2011–2012 season. Variables related to knowledge of and attitudes to influenza vaccination were covered by a set of questions evaluated on a Likert scale with 5 categories: completely agree, agree substantially, neither agree or disagree, disagree substantially, and completely disagree. These variables were then categorized into two categories: Yes (complete and substantial agreement), and No (neither agree nor disagree, substantial and complete disagreement). The variable years of professional experience was categorized by quartiles.

2.3. Ethics

All information collected was treated as confidential, in strict observance of legislation on observational studies. An email was sent to physicians inviting them to participate. By clicking on the link to the questionnaire, physicians implicitly consented to participate. As the survey was answered online, written consent was not sought. The initial email explained that all answers would be anonymous. In the stored data, respondents were identified only by a number. The study protocol, including the consent procedure, was approved by the Ethics and Clinical Research Committee of the JordiGol Institute for Research in Primary Care.

2.4. Statistical analysis

Various multivariate techniques are used to differentiate groups of individuals, including factor analysis (FA), multiple correspondence analysis (MCA) and cluster analysis (CA) [22]. Techniques such as FA and MCA synthesize information on the original variables into a few components, making data interpretation feasible or easier. FA is designed for continuous variables, whereas MCA is designed for qualitative variables [26].

The multivariate technique selected for the analysis was MCA, because the variables were categorical. In this context, variables included in the analysis were defined as active variables, while illustrative variables were defined as those that were not included in the analysis but were used to check their relationship with active variables.

The unit of analysis was physicians who answered the survey. A descriptive analysis was made of socio-demographic variables, and physicians' knowledge of and attitudes to influenza were calculated using frequencies and percentages.

Active variables included in the MCA analysis were sex, age group (25–34 years, 35–44 years, 45–54, years and >54 years), years of professional experience (≤15, 16–20, 21–27, and >27), participation in the influenza sentinel surveillance network (yes or no), training in influenza (yes or no), and attitudes to influenza (influenza is a severe disease, concerns about transmission, beliefs on the effectiveness of vaccination, and worries about becoming ill due to influenza) (yes or no). Influenza vaccination in the 2011–2012 season (yes or no) and the type of center where the physician worked were used as illustrative variables or outcomes. The type of center was defined as 'small' (centers with ≤6 professionals), 'medium' (7–15 professionals) and 'large' (≥16 professionals).

MCA is an exploratory technique that provides descriptive patterns derived from the categories of the original active variables. This technique transforms the information on the original categorical active variables into continuous factors. Each category of active variables is represented on the continuous factors by a numeric and a positive/negative sign, which are used for interpretation.