Socioeconomic status, demographics, beliefs and A(H1N1) vaccine uptake in the United States

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ABSTRACT

Early vaccination against influenza viruses is a cost-effective solution to prevent contagion and reduce influenza-related morbidity and mortality. In the face of pandemic viruses, such as the A(H1N1), adequate rates of vaccine uptake play a critical role in containing the spread and effects of the disease. In order to understand the reasons underlying the relatively low 2009–2010 A(H1N1) vaccination rates, we conducted an online survey of 1569 respondents drawn from a nationally representative sample of United States (U.S.) adults age 18, and older. Because prior research suggests that vaccination rates are especially low among some U.S. population subgroups, we oversampled participants from minority ethnic/racial groups and those living under the Federal Poverty Level. Our results show that A(H1N1) vaccine uptake is associated with sociodemographic factors, A(H1N1)-related beliefs and seasonal vaccination. That is, A(H1N1) vaccination is strongly associated with age, urbanicity, perceiving the A(H1N1) vaccine as safe and seasonal flu vaccine uptake. Perceptions of safety and season flu vaccination show the strongest associations with A(H1N1) uptake. The reasons people gave to decline vaccination varied by respondents' sociodemographic group. For example, Black participants were the most likely ethnic/racial group to reported having tried to get the vaccine but found it unavailable. Together, these findings suggest some clear pointers towards strategic public health communication efforts calling for communication campaigns towards audiences segmented by social class, race/ethnicity and beliefs, often what advertisers call "psychodemographics".

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1. Introduction

Early vaccination against influenza viruses is a cost-effective solution to prevent contagion and reduce the number of flu-related deaths [1]. Nonetheless, year after year, the majority of the U.S. population fails to receive the flu vaccine [2]. The reasons for not receiving the vaccine range from socioeconomic barriers to medical, cultural, sociopolitical and religious [3,4]. As a consequence, vaccination uptake is not uniform across the U.S. population, but varies among different sociodemographic, political, ethnic and cultural groups. Multiple studies have shown that ethnic/racial minorities and those of low socioeconomic position display lower seasonal influenza vaccination rates across all age groups [5,6]. Little is known, however, about how barriers and objections to A(H1N1) vaccination vary and affect vaccine uptake across different population subgroups.

The A(H1N1) virus was first found in humans in April 2009. A year later, 214 countries and overseas territories reported laboratory-confirmed cases of A(H1N1) [7]. Initial surveys showed that the general population in the United States expressed relatively high intentions to receive the vaccine. For instance, by September 2009 50% of the adult population intended to receive the vaccine. This number rose up to 70% for children during the same time period [8]. Nonetheless, the joint influence of delays in vaccine production, declining concerns about contracting the virus and circulating messages questioning vaccine safety and the severity of the virus, seemed to have had a tempering effect over those initial intentions [9]. By the end of January 2010, only 24% of the US population reported receiving the vaccine, significantly less than those who receive the seasonal flu vaccine year after year [10].

Moreover, vaccination rates varied among population groups. For example, the Centers for Diseases Control and Prevention (CDC) estimated that A(H1N1) vaccine uptake was higher among non-Hispanic Whites than Blacks [11]. The difference between these two groups was most evident among healthcare workers, suggesting that vaccine access was not the sole underlying cause for these results. It is likely – as is the case with the seasonal influenza vaccine – that attitudinal and health belief differences exist among

different population subgroups. Whereas several reports showed the association between vaccination-related beliefs, seasonal vaccination and either intent to receive the A(H1N1) vaccine or actual vaccination behaviour [9,12–15], little is known about how these associations vary across population subgroups.

Better understanding the reasons underlying vaccination rate differences among population subgroups may have significant implications for public health policy and practice. That is, scrutinizing the critical determinants of vaccine uptake is necessary to develop global and targeted risk communication campaigns to promote vaccine uptake across the U.S. population. The main goal of the present study is to explore the reasons underlying the differences in A(H1N1) vaccination among different population subgroups and discuss their possible implications for future vaccine campaigns.

2. Materials and methods

2.1. Respondents

In March 2010, we collected data from 1569 respondents drawn from a nationally representative sample of U.S. adults age 18 and older, participating in Knowledge Networks' KnowledgePanel©. Members of this nationally representative panel are recruited using a dual sampling frame, a combination of Random Digital Dial and Address-Based Sampling, which allows for sampling of individuals with no telephone land lines. Additionally, when recruited, non-Internet households are provided with a laptop computer and free Internet access. Participants received nominal cash incentives to participate in this survey. For the current study, participants from minority ethnic/racial groups and those living under the Federal Poverty Level were oversampled. The response rate was 66.3%.

2.2. Survey design

The survey questions were constructed based mainly on two sources: focus groups data and pre-existing surveys. We conducted 5 focus groups with participants from diverse ethnic/racial and socioeconomic backgrounds. Key themes gravitated around topics related to A(H1N1) knowledge, preventive behaviour, attitudes, beliefs, mass and interpersonal communication, and emergency preparedness in general. This information was used to generate new survey items, which were combined with items adapted from the Harvard Opinion Research Program H1N1 Survey, the Health Information National Trends Survey (HINTS), and from the CDC's Behavioral Risk Factor Surveillance System (BRFSS). The survey was finalized after a round of cognitive interviews with potential participants.

2.3. Measures

2.3.1. Independent variables

For the purpose of this report, we included three sets of independent variables: (1) socioeconomic status (SES) and demographics; (2) A(H1N1)-related beliefs; and (3) seasonal flu-vaccination uptake. SES and other demographic variables included sex, age, race/ethnicity, education, income and urbanicity. Two A-(H1N1)-related beliefs were examined: those related to A(H1N1) perceived susceptibility and to A(H1N1) vaccine safety. (*How likely do you think it is that someone in your community may get sick from H1N1 during the next 12 months?*) The reason for including the "community" as a reference for perceived susceptibility, as opposed to family or self susceptibility, is to minimize the potential effects of actual vaccination on personal or family risk estimation. (*On a scale of 0 to 10, how safe do you believe the vaccine for influenza H1N1 will generally be for most people to take?*) Responses to the perceived susceptibility and vaccine safety questions were dichotomized as

likely/unlikely and unsafe/safe, respectively. Lastly, seasonal flu-vaccination uptake was measured. (*Have you received the seasonal flu vaccine this flu season?*)

2.3.2. Dependent variables

The main outcome variable was A(H1N1) vaccine uptake. (*There is a specific vaccine to prevent against H1N1. Have you received the vaccine?*) Those participants who responded not having received the vaccine were classified into four groups: (a) will get the vaccine but have not tried yet; (b) have tried to get the vaccine but has not been available; (c) do not know whether will get the vaccine or not; and (d) will not get the vaccine. The reasons for not receiving the A(H1N1) vaccine were probed for those participants in the (c) and (d) groups.

2.3.3. Statistical analyses

Post-stratification weights were used to adjust for non-coverage and non-responders biases. These adjustments were made by applying the most recent data from the Current Population Survey [16] and the 2006 Pew Hispanic Center Survey of Latinos [17]. Post-stratification weighting included gender, age, race/ethnicity, education, census region, urbanicity, Internet access and dominant language.

Descriptive analyses, expressed as weighted frequencies and percentages, were performed. A hierarchical logistic regression analysis was conducted to stress the association between SES and demographics alone and A(H1N1) vaccine uptake (model 1); and between social determinants, A(H1N1)-related beliefs, seasonal vaccine uptake, and A(H1N1) vaccine uptake (model 2). This was followed by two logistic regression analyses designed to measure the association between social determinants and beliefs about vaccine safety, and between sociodemographic factors and seasonal flu vaccine uptake.

Using cross tabulations, we then examined the bivariate associations between SES and demographic factors, A(H1N1)-related beliefs, seasonal influenza vaccination and different responses of those who did not receive the A(H1N1) vaccine. The statistical significance of these associations was tested using Pearson's χ^2 test and two-sided z-tests for equality of proportions, when appropriate. Lastly, this same procedure was used to analyze the different reasons participants reported as the major determinants for not having received the A(H1N1) vaccine.

3. Results

At the time of the survey, 20% of participants had received the A(H1N1) vaccine. Uptake was associated with SES, demographic factors, A(H1N1)-related beliefs, and seasonal vaccination. Our first hierarchical regression model showed an association between race/ethnicity, age, education and A(H1N1) vaccine uptake. Whereas Hispanics showed the highest vaccination rate, young adults (30–44 years old) and those with only high school degrees showed the lowest rates (Table 1; *model 1*).

When analyzing these associations jointly with the influence of non-sociodemographic variables (i.e. A(H1N1)-related beliefs and seasonal flu vaccination) the association between sociodemographic factors and vaccine uptake became non-significant. In our complete regression model, age was the only sociodemographic factor associated with A(H1N1) vaccine uptake (Table 1; *model 2*). Thus, when controlling for beliefs and seasonal vaccination, the youngest in our survey (18–29 years old) rose as the most likely age group to receive the A(H1N1) vaccine.

Equally compelling were the data that show that vaccine safety beliefs are critical determinants of A(H1N1) vaccine uptake. Those who believed that the A(H1N1) vaccine was safe were