Eur J Epidemiol (2009) 24:339–342
DOI 10.1007/s10654-009-9351-x

COMMENTARY

Lay perceptions of the pandemic influenza threat

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Received: 13 May 2009 / Accepted: 14 May 2009 / Published online: 30 May 2009

Abstract A national survey on the public perception of the pandemic threat was conducted in France during the summer of 2008. Although the majority of the respondents displayed beliefs and attitudes toward the pandemic threat that could be considered as adaptive in the face of an outbreak, our results suggest that there are identifiable needs for public information about the transmission and prevention of the disease.

Keywords Attitudes · Beliefs · Pandemic influenza · Perception · Prevention

During recent weeks, the rapid spread of the H1N1 subtype influenza A virus in North America has raised concerns over the emergence of a potentially catastrophic influenza pandemic in both scientific and lay communities throughout the world. Development of strategies for mitigating the epidemiological and socioeconomic consequences of a novel influenza pandemic constitutes a top priority today for numerous public health organizations. Influenza prevention and control strategies can be divided into the two broad categories of pharmaceutical and non-pharmaceutical measures. However, because of the lack of availability of adequate vaccine at the start of the pandemic—and for many months thereafter, non-pharmaceutical interventions have been increasingly recognized as a critical part of mitigation strategies in the epidemiological literature [1–3]. Examples of non-pharmaceutical interventions include administrative control measures (case isolation, quarantine, school closure, restrictions on travel) and personal protective measures (behavioral changes such as social distancing or improved hygiene). Recent epidemiological models have shown that the rapid implementation of some of these measures might substantially reduce the disease reproduction number in a pandemic influenza wave [4, 5].

However, the acceptance of, and adherence to these public health measures by the population depends largely on the way people perceive the pandemic influenza threat. Indeed, a vast array of researchers have demonstrated that the perceptions that are drawn from mental representations shape to a large extent the nature and magnitude of behavioral responses for controlling health threats [6]. Among the most influential theoretical frameworks, the self-regulation model posited that any perception of health threat incorporates a small number of structural factors, including nature, causation, consequences, control and fear. Evidence from many empirical studies provides strong support for a causal relation between these cognitive factors and a range of behavioral outcomes such as compliance with public health recommendations [7]. Moreover, public perceptions of a health threat have to include a perception of the risk and a perception of the effectiveness of the recommended actions in order to reduce the risk [8]. Characterizing these lay perceptions of the pandemic influenza threat, as well as their sociodemographic distribution among the French population is the focus of this

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paper. To date, only a few exploratory studies have been devoted to this important issue.

The primary data were collected in France by means of computer-assisted telephone interviews of French adults aged 18 and over in June 2008. Proportional random digit dialing was used to select the survey participants from across the country. To ensure the national representativeness of the sample, a stratified selection procedure based on the administrative area population (regions and communes/counties) was used. Gender, age and occupation of respondents were also controlled so that the sample approximated the most recent census data. A total of 1,003 individuals were interviewed, with a response rate of 37.3%.

The questionnaire was constructed from the existing literature—in particular from an adapted version of the illness perception questionnaire that included a wide range of items related to personal controls, efficacy of treatment, understanding, and fear of the threat. Most questions were based on a conventional response format (scale 1–5) and summed to generate scores on the cognitive scales. The perceived causes were measured separately through the identification of possible routes of disease transmission (scale 0–1). Risk perceptions were assessed based on the Brewer et al.'s [9] conceptual framework. Participants were asked to appraise their risk of becoming infected, and the severity of an infection with pandemic influenza (scale 1–10). Finally, respondents were asked to appraise the effectiveness of a set of behavioral measures that might be considered adequate to mitigate the threat (scale 0–1). These interventions could be grouped into three categories: hygiene, social distancing, and pharmaceutical measures.

Overall, the results revealed a range of remarkable phenomena that might be important to consider for preparedness in the case of a pandemic. First, a considerably higher proportion of respondents believed that the infectious agent of pandemic influenza might spread from human to human through direct contacts with saliva or aerosol droplets from infected people (>80%) than through indirect contacts with contaminated fomites (>50%) (Fig. 1). This difference suggests that a large percentage of the lay public think that the infectious agent can not survive nor maintain its infectiousness for a long time outside its human host. This belief about the transmission of the disease could be potentially maladaptive since microbiological research has shown that viruses were able to persist for extended periods of time on numerous types of materials commonly found in public and domestic environments, such as door knobs [10].

Second, the pharmaceutical measures were not viewed by the lay public as more adequate to prevent the disease than were non-pharmaceutical measures. Indeed, the effectiveness of hygiene improvement measures, such as washing hands or wearing face masks, were much more readily recognized (>70%) than those of the social distancing or pharmaceutical measures, such as taking antiviral drugs (>60%) to reduce the risk of infection. This pattern of response is probably due to the fact that the non-pharmaceutical measures, as opposed to pharmaceutical measures, are viewed as being not time limited, i.e., they can be implemented for the duration of the pandemic. Although certain non-pharmaceutical measures remain scientifically controversial, there is now a relative consensus among experts that the majority of them should be recommended in the case of an outbreak. Another important point concerns immunization: a significant portion of the population (40%) erroneously believed that vaccination against seasonal influenza would protect them from the pandemic influenza threat (Fig. 2). This result suggests that the population as a whole does not yet well understand the

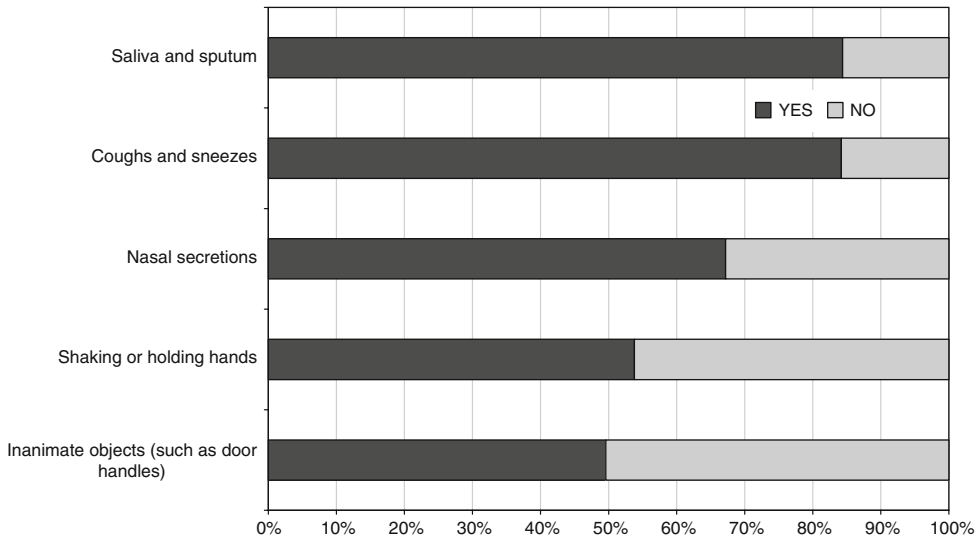

Fig. 1 The perceived routes of transmission of pandemic influenza (% respondents)

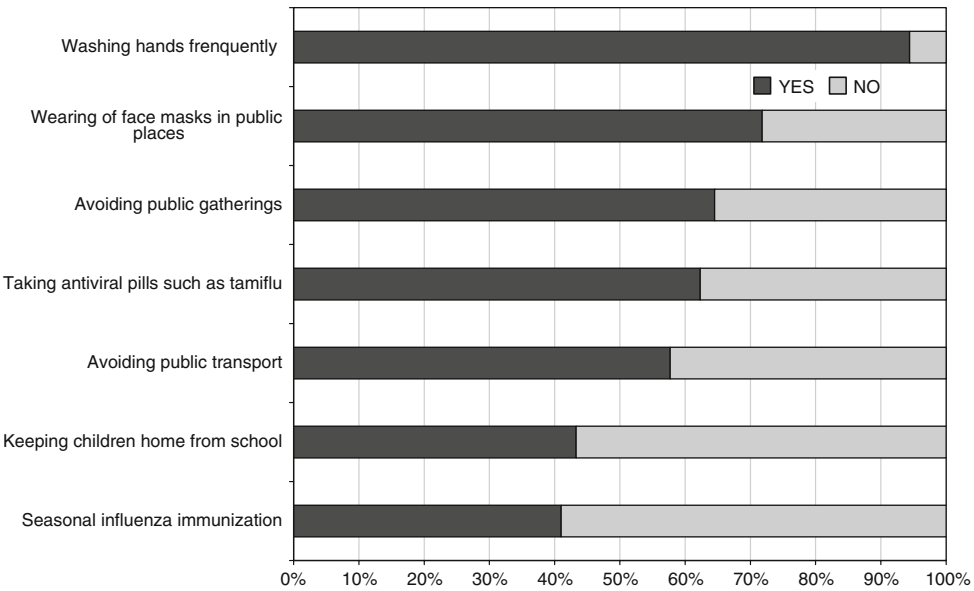

Fig. 2 The perceived effectiveness of seven measures of prevention (% of respondents)

Table 1 Lay perceptions of pandemic influenza thread by sociodemographic characteristic (means, standard error, and significance)

	Vulnerability	Severity	Fear	Controllability	Efficiency	Consequence	Understanding
Gender							
Male	2.72 (0.12)	6.48 (0.11)	3.03 (0.05)	4.14 (0.03)	3.31 (0.03)	3.45 (0.04)	3.59 (0.04)
Female	3.01 (0.12)	6.94 (0.09)	3.27 (0.05)	4.00 (0.03)	3.24 (0.03)	3.59 (0.03)	3.70 (0.03)
P value	0.078	0.001***	0.001***	0.004**	0.103	0.004**	0.022*
Age group							
15–24	3.17 (0.27)	6.81 (0.19)	3.10 (0.11)	3.96 (0.07)	3.19 (0.06)	3.45 (0.09)	3.65 (0.08)
25–34	3.13 (0.21)	6.54 (0.18)	3.19 (0.09)	4.06 (0.06)	3.23 (0.06)	3.46 (0.06)	3.56 (0.07)
35–44	2.71 (0.16)	6.60 (0.14)	3.12 (0.07)	4.16 (0.04)	3.30 (0.04)	3.57 (0.05)	3.59 (0.05)
45–59	2.99 (0.17)	6.78 (0.16)	3.23 (0.08)	4.14 (0.05)	3.28 (0.04)	3.48 (0.04)	3.60 (0.05)
> 59	2.63 (0.17)	6.85 (0.15)	3.13 (0.07)	3.97 (0.05)	3.29 (0.04)	3.59 (0.02)	3.81 (0.05)
P value	0.176	0.598	0.821	0.008**	0.592	0.233	0.009**
Occupation							
Students	3.20 (0.28)	6.99 (0.20)	3.19 (0.11)	4.04 (0.07)	3.21 (0.06)	3.50 (0.09)	3.60 (0.09)
Unemployed	2.76 (0.35)	7.04 (0.29)	3.38 (0.17)	4.13 (0.09)	3.29 (0.09)	3.58 (0.11)	3.62 (0.12)
Blue-collars	2.87 (0.13)	6.45 (0.12)	3.17 (0.06)	4.11 (0.04)	3.28 (0.04)	3.45 (0.04)	3.67 (0.04)
White-collars	3.02 (0.18)	6.78 (0.15)	3.10 (0.07)	4.12 (0.04)	3.26 (0.04)	3.59 (0.05)	3.52 (0.05)
Retired	2.60 (0.17)	6.89 (0.15)	3.15 (0.07)	3.97 (0.05)	3.30 (0.05)	3.58 (0.05)	3.76 (0.05)
P value	0.303	0.065	0.636	0.095	0.878	0.165	0.026*
Education							
Low	2.81 (0.14)	6.82 (0.12)	3.29 (0.06)	3.95 (0.04)	3.29 (0.03)	3.51 (0.04)	3.82 (0.04)
Intermediate	2.82 (0.17)	6.56 (0.15)	3.20 (0.08)	4.11 (0.05)	3.31 (0.05)	3.44 (0.05)	3.70 (0.05)
High	2.95 (0.13)	6.71 (0.11)	2.99 (0.06)	4.16 (0.03)	3.24 (0.04)	3.59 (0.04)	3.45 (0.04)
P value	0.753	0.383	0.002**	0.000***	0.337	0.062	0.000***
Income							
Low	2.71 (0.19)	6.71 (0.17)	3.27 (0.09)	3.97 (0.06)	3.24 (0.05)	3.52 (0.06)	3.74 (0.06)
Intermediate	2.79 (0.12)	6.69 (0.11)	3.16 (0.06)	4.09 (0.03)	3.28 (0.03)	3.53 (0.04)	3.66 (0.04)
High	2.82 (0.17)	6.62 (0.16)	2.97 (0.08)	4.16 (0.05)	3.32 (0.05)	3.49 (0.06)	3.52 (0.06)
P value	0.904	0.908	0.026*	0.028*	0.530	0.852	0.023*
Total	2.87 (0.08)	6.72 (0.07)	3.16 (0.04)	4.07 (0.02)	3.27 (0.02)	3.53 (0.02)	3.65 (0.03)

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$

scientific principle of the antigenic mutability of the influenza virus or the parallel principles of the momentary and restricted efficacy of many vaccines.

Third, with the exception of the perceived vulnerability, the mean scores were all greater than the median value on the response scales adapted from the illness perception questionnaire. These data indicate that a large part of the public in our country would be likely to adopt adaptive behaviors in the face of a new pandemic of highly pathogenic influenza. Although some substantial variations were recorded from one factor to another, a majority of the respondents were found to have a range of mental representations of the threat and its prevention that have been demonstrated in the recent literature to trigger an effective behavioral response to reduce the risk of infection. However, it should be noted that there are substantial differences in the way respondents perceive the threat of pandemic influenza depending on their socioeconomic status (Table 1). Although all the cognitive variables did not appear to be socially sensitive, a number of key threat representation factors that have been repeatedly found to predict behavioral change—in particular the perceived control, understanding and fear of the disease—were significantly shaped by socioeconomic characteristics such as gender, age, education, and income of respondents. This finding is not surprising since a vast array of empirical studies have reported marked socioeconomic disparities in perception of risk, as well as health outcomes (incidence, mortality and survival) associated with emerging respiratory infectious diseases. In the past decade, a range of socio-epidemiological studies have documented significant socioeconomic differences in mortality from the 1918–1919 Spanish influenza, as well as from more recent influenza pandemics [11, 12]. Disparities in the nature and scale of protective behaviors are generally identified as one of the primary pathways through which social conditions affect these health outcomes.

To conclude, our findings have several important implications for public health professionals. Our results suggest that the majority of lay persons had, a few months before the North American outbreak of H1N1 influenza, relatively adaptive beliefs about and attitudes toward emerging infectious respiratory diseases. Thus, a large proportion of the population also believed that non-pharmaceutical precautions such as improved hygiene and social distancing measures are effective to reduce the risk of contracting the disease. Nevertheless, our results also point to the need for public information about infectious respiratory diseases, since many survey respondents have a number of inadequate beliefs about influenza transmission and prevention which might contribute to adverse socio-epidemiological effects. Notably, the data highlight the importance of a discussion in the biomedical community about the public availability of antiviral drugs at this time, since a non-negligible percentage of people are tempted to purchase doses of tamiflu® to prevent the infection. These individualist behaviors may greatly perturb an efficient allocation of limited resources in case of massive outbreak.

Acknowledgments This work was financially supported by the Research Fund devoted to 'avian influenza' of the French Agence Inter-etablissement pour la Recherche et le Developpement (AIRD).

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