

Knowledge about pandemic influenza and compliance with containment measures among Australians

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Introduction

To limit the spread of disease during the early containment phase of an influenza pandemic response, WHO recommends the use of non-pharmaceutical interventions (NPIs), including public education, social distancing, home quarantine and travel restrictions.¹ These control measures are reflected in the Australian Health Management Plan for Pandemic Influenza.² However, compliance with this approach is dependent on community understanding of the required control measures and their value in disease mitigation.³ Historical records show that if NPIs are promptly implemented during pandemics, disease transmission can be reduced,⁴⁻⁷ an observation supported by mathematical modelling.⁸

This study examines the Australian public's understanding of pandemic influenza, its expressed willingness to comply with public health containment measures, and factors influencing compliance.

Methods

Study participants and study protocol

A cross-sectional computer-assisted telephone interview survey of a representative sample of Australians aged 18 years and over was conducted in June 2007. The latest Australian telephone database available electronically, the 2002 Electronic White Pages, was used to provide sample proportions for all states and territories. By using a random number generator, a corresponding sample of names, addresses and telephone numbers was drawn from the 2007 printed telephone directories according to telephone exchange regions. An introductory letter was dispatched to all households a week before telephone contact was made. Experienced telephone interviewers made calls between 09:00 and 20:00 local time, with up to seven contact attempts made for each randomly-selected telephone number. The adult household member whose birthday was closest to the interview date was invited to participate. Those eligible were people 18 years or older who provided verbal consent and could converse in English.

Sample size was calculated for an α of 0.05 and a power ($1 - \beta$) of 0.80 using prevalence information from a comparable study in the United States of America (USA).⁹ We estimated that approximately 1200 respondents would be required to provide statistically sound estimates at the national level.

Interview questions covered five principal areas: demographics and household circumstances, knowledge about pandemic influenza, expressed willingness to comply with containment measures, barriers to compliance with containment measures, and the preferred method for receiving health communication. In this report, the exact questionnaire wording is recorded in italics.

From a total of 2201 telephone contacts, there emerged 1166 successful interviews; 846 refusals (279 gave no reason, 248 stated no interest, 115 householders did not pass the call through to the eligible person, 58 indicated being too busy, 53 felt too ill, 93 gave miscellaneous reasons) and 189 cases of ineligibility (reasons recorded for 159: 111 were non-English speaking, 24 were at business numbers, 15 had an illness that limited comprehension and 9 had hearing difficulties). This resulted in a participation rate of 58.0%.

Interview procedure

Participants were asked if they understood the term “pandemic influenza”. Those that answered in the affirmative were then asked four questions, each with two possible reply options. Following this, to ensure that all respondents were able to answer the remaining questions regardless of their knowledge of influenza, everyone was informed that “pandemic influenza is a disease that is spread between people”. The compliance questions were asked early in the interview and repeated towards the end after the following information was provided: “We are talking about an entirely new type of influenza virus that spreads easily from person to person. No one would have natural immunity to it and every age group could be affected. Potentially a quarter to a third of the population could get sick. In the 1918 Spanish flu pandemic at least 40 million people died and a third of the world’s population was infected. In this case, the usual flu vaccine would not have prevented illness”.

Statistical methods

The change in reported willingness to comply with public health measures before and after providing informing on pandemic influenza was assessed using McNemar’s test for paired data. Through univariate logistic regression models, we identified factors potentially related to non-compliance with proposed measures, and multivariable logistic regression models were developed using a backward stepwise procedure. Base SAS and SAS/STAT components of SAS 9.13 statistical software (SAS Institute Inc., Cary, NC, USA) were used for all analyses. The sample population was weighted to the age-sex distribution of the Australian adult population in all models.¹⁰ Results are presented as odds ratios (ORs) and their 95% confidence intervals (CIs).

Ethics

Ethics approval was obtained from the Hunter New England Human Research Ethics Committee (approval number 07/04/18/5.06).

Results

The estimated resident Australian population for 2006 was used to assess the representativeness of the study sample.¹⁰ There were more females (61.6%) than males and older age groups were moderately over-represented, but geographically the sample closely reflected the Australian population distribution. In 140 (12.0%) cases a language other than English was spoken at home and sample data closely matched census data in terms of education.¹¹ Unless otherwise stated, the denominator used for the analysis was the complete sample of 1166 individuals.

Knowledge of pandemic influenza

When asked whether they were “familiar with the term pandemic flu or pandemic influenza”, 44.3% of participants replied that they were, 31.1% were unsure and 24.5% reported not having heard the term. Those who claimed familiarity were then asked:

- if the disease “(a) was usually mild and rarely caused death; or (b) could be serious with some deaths expected” – 97.3% answered correctly (b);
- if the disease “(a) could spread within a single country; or (b) spread through all countries” – 86.5% answered correctly (b);
- if “(a) all ages could be affected; or if (b) the young and elderly were most likely to be affected” – 66.7% answered correctly (a);
- if the disease “(a) is easily spread by coughing and shaking hands; or (b) not” – 86.1% answered correctly (a).

Among this group, 50.9% of respondents provided correct answers to all four questions. Of the 517 who claimed to know about pandemic influenza, 33.1% thought there had been cases in the last 5 years, 60.9% correctly reported no cases and 6.0% were unsure.

Risk perception

After being informed that “pandemic influenza is a disease that is spread between people”, respondents were asked if they considered it likely that pandemic influenza would occur in Australia in the next 5 years. Overall, 15.2% thought it likely, 44.4% thought it somewhat likely, 24.3% considered it not very likely, 7.0% thought it not at all likely, and 9.1% reported not knowing. Of the 476 respondents in paid employment but not self-employed, 14.1% indicated that their employer had made business continuity plans for a pandemic or similar emergency.

Willingness to comply

All respondents were asked if they were willing to comply with specific public health containment measures. Responses were graded as either compliance or non-compliance (“don’t know” responses were included in the latter group). This question was repeated

towards the end of the interview after a brief description of pandemic influenza had been provided (Table 1).

[Table 1. Stated intention to comply with control measures before and after briefly describing pandemic influenza to a sample of Australian adults surveyed by telephone, 2007 \[html\]](#)

Home quarantine

Willingness to comply with home quarantine was analysed according to demographic data (Table 2). We found that gender, being employed but unable to work from home and having a basic knowledge of pandemic influenza (respondents who provided correct answers to all four questions) were statistically associated with stated willingness to comply. When these parameters were included in a multivariate model, they remained statistically significant (Table 2).

[Table 2. Stated intention to comply with home quarantine following exposure to pandemic influenza in a sample of Australian adults surveyed by telephone, 2007 \[html\]](#)

Overall, 75.5% of respondents answered having someone who could care for them if they were in home quarantine. For fever monitoring, 56.6% of respondents reported owning a functional thermometer. In 52.5% of households there was an occupant requiring daily medication and 51.8% reported having food storage for 7 days or less.

Financial independence

Of the 611 employed respondents (52.4% of the total sample), 36.7% reported no current leave entitlements and 27.2% had up to 4 weeks. If the emergency went beyond 2 weeks, 30.4% reported they would experience financial difficulties.

Social distancing

Of respondents from the 394 households with children, 96.7% claimed they would keep the children away from others for one month if schools and child-care facilities were closed. If their “town or neighbourhood were placed in quarantine”, 84.8% reported that they would “very likely” stay within the quarantine area, 10.4% said they would be “somewhat likely” to stay, 2.0% were “not too likely” and 2.8% were “not at all likely” to stay. Of the 581 respondents who had used air transport in the past 12 months, 97.2% reported being willing to avoid air travel for a month if requested.

Additional measures

In the event of exposure to pandemic influenza, 88.3% of respondents reported being willing to take antiviral medication, but when told the drugs were “not guaranteed to be effective and could cause some minor side effects like stomach discomfort” this proportion dropped to 70.0%. Reasons for refusal included a fear of side-effects, a preference for natural therapies and willingness to accept the risk that exposure may lead to disease. When asked “during a pandemic, would you wear a surgical-type mask when mixing with people in public if asked to do so?” 95.1% of participants reported being willing to comply with this control measure. When asked if they were willing to present to a special

assessment clinic as requested instead of to their general practitioner if they thought they had pandemic influenza, 94.0% answered affirmatively.

Communication

The single “preferred method for receiving detailed information on important health issues” was stated to be television (31.2%) mail (27.8%), Internet (13.9%, with 68.1% reporting home Internet access), radio (13.8%), newspapers (11.0%) and other (2.3%). The person most trusted “to provide reliable health information to the media” was the state/territory chief medical officer (44.3%), a local health spokesperson (28.4%), the Prime Minister (16.1%), the state premier/chief minister (3.1%), and 7.9% of respondents were unsure. When seeking “more information on pandemic flu”, contacting a general practitioner was the preferred option (33.2%), followed by; accessing an official web site (31.8%), telephoning a health hotline (29.2%) and contacting the public health unit (4.4%).

Discussion

Only 44% of this national sample of adult Australians reported any knowledge of the term “pandemic influenza”, a finding similar to that of a study conducted in the USA in 2006 in which 41% of respondents had previously heard of this term.⁹ Further investigation revealed that only 51% of Australian respondents familiar with the term were able to correctly answer all four basic knowledge questions, so that the true proportion of Australians with a reasonable understanding of pandemic influenza may be as low as 23%. Our multivariable logistic regression model showed a strong association between a demonstrated basic knowledge of pandemic influenza and willingness to comply with home quarantine. These findings lend support to the value of a campaign to improve knowledge before an actual health emergency, as the threat of a serious disease outbreak can generate fear and misapprehension and thereby complicate response efforts if the public is ill-informed.¹²

In an early containment response, control of pandemic influenza and other emerging communicable diseases for which no vaccines are currently available is dependent on community compliance with NPIs.⁴⁻⁶ The level of compliance may be influenced through the provision of accurate information delivered within a structured communication programme.¹³ Distribution of promotional material during the inter-pandemic period will demonstrate to the public that health authorities are transparent about the risk and have containment plans in place. This has the added benefit of allowing people to accept socially unfamiliar control measures such as wearing masks and home quarantine, before a pandemic occurs. The strategy should also include the promotion of personal infection control practices, such as hand washing, fever-monitoring and staying at home when sick – all lifestyle activities that would protect against any communicable disease.

Our findings suggest that in Australia, television, direct mail-out, the Internet and the radio are the preferred media for disseminating information about pandemic influenza. When it comes to pandemic information, people appear to trust state or local health representatives above politicians. Our finding that general practitioners were the preferred source of additional information highlights the importance of including them in any communication plan for the containment of pandemic influenza. An Australian study

conducted in 2004 also showed that general practitioners were regarded by the public as a source of reliable information during emerging infectious disease threats.¹⁴

The low percentage of respondents who considered pandemic influenza likely to occur in the next 5 years resembles the percentage reported in a 2007 study conducted in New South Wales, Australia.¹⁵ As health protection actions are influenced by risk perception, a communication strategy will need to focus on providing a simple and convincing risk assessment¹⁶ while concurrently offering recipients ways to mitigate the risk to themselves, their family and their community.

The reported level of willingness to comply with three principal containment measures exceeded 90%, a finding similar to that of a 2006 study in the USA.⁹ However, with the delivery of minimal additional information about the seriousness of the disease, it was possible to increase this to over 97%. The willingness to wear a mask during a pandemic was surprisingly high (95%), particularly as this is not common practice in Australia. Use of masks by the general public in China, Hong Kong, Special Administrative Region, during the 2003 severe acute respiratory syndrome (SARS) outbreak was below this level. The fact that it increased from 12% on day 10 to 85% on day 62¹⁷ shows that the public is more likely to adopt NPIs as risk perception increases. This general willingness to wear masks is an excellent starting point for targeted reinforcement through health education messages. Modelling suggests that the higher the secondary infection rate, the more compliance will be necessary for NPIs to be successful.⁸

Study limitations

We were able to survey a large, representative cross-section of the adult Australian public. However, the study design was based on telephone contact, so that people without a landline telephone and those living in areas not connected to a telecommunication network were excluded. While information is not available for the entire country, in 2007 landline coverage was reported to be 89.3% in Western Australia¹⁸ and in 2003, Queensland's coverage was found to be 95.3%.¹⁹ The personal telephone approach to collecting data may have encouraged respondents to report greater willingness to comply with measures than if a passive reporting method, such as an online questionnaire, had been applied. It is also likely that when individuals are confronted with an actual pandemic situation and more specific information becomes available, their behaviour may deviate from their stated intention. Researchers wishing to conduct similar studies in countries where access to landline telephones is limited may need to consider using other survey methods.

Our response rate of 58% exceeds the recommended 50% minimum mark suggested by Lindner to reduce the threat of non-response error.²⁰ Regardless, we acknowledge that we still lack information about a substantial proportion of the target population. With interviewers instructed to respect the right of people to decline to participate in surveys, obtaining data from this group will always remain a challenge. Non-responders may also be difficult to reach in a health emergency and less likely to comply with public health measures than responders, a fact that further emphasizes the value of an early and multi-pronged promotional approach.

There were 111 telephone contacts with people who did not speak English and could not be interviewed. If this group is combined with other minorities, such as Aboriginal

Australians and Torres Strait Islanders, who are under-represented in telephone ownership, then important sub-populations deserve further consideration. The special circumstances of people with low incomes and of racial and ethnic minorities have been previously noted.²¹ Out of humanitarian and epidemiological considerations, specific research based on culturally appropriate methods should be conducted, to ensure that minorities and marginalised groups are not neglected during communication efforts to prepare for a future pandemic.

Conclusion

In the early containment phase of a pandemic response, compliance with social distancing and adherence to stringent infection control practices will be critical for limiting community transmission. Our findings suggest that people with a basic knowledge level are more likely to comply with public health containment measures than those who lack such knowledge, yet studies in both Australia and the USA have shown that much of the public has a limited understanding of pandemic influenza. In addition, stated compliance with containment strategies, regardless of how high, can be further improved by providing some basic health information. We encourage investment in an inter-pandemic communication strategy that honestly and accurately informs the public of the threat and of the measures that will mitigate risk to themselves and to their families and communities. Furthermore, if such a strategy were applied today, it could have immediate value in limiting the transmission of other communicable diseases, as well as long-term benefits in preparing people for a sustained effort against pandemic influenza. A strong public communication plan should be given equal status with other NPIs in the global response stratagem.

This manuscript describes the first national survey to determine the state of public knowledge on pandemic influenza in Australia and explores important factors that may determine the success of containment policies such as social distancing and home quarantine. A communication strategy consisting of key messages and delivered through preferred communication channels would significantly increase the Australian public's willingness to comply with recommended containment measures. Very few large national studies of this type have been reported in the literature, and this may be the first to actually explore the public's understanding of pandemic influenza and statistically relate it to compliance. Obtaining information on the public's knowledge, level of cooperation and preferred communication channels before a pandemic may be useful for developing national communication strategies. From our findings policy-makers and researchers in other countries may come to understand the issues they should explore in more detail in their own settings. The information presented in this manuscript is important for the planning of successful pandemic containment strategies in Australia and may have international relevance. ■

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