Knowledge about pandemic influenza and compliance with containment measures among Australians

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Objective To examine the level of stated compliance with public health pandemic influenza control measures and explore factors influencing cooperation for pandemic influenza control in Australia.

Methods A computer-assisted telephone interview survey was conducted by professional interviewers to collect information on the Australian public’s knowledge of pandemic influenza and willingness to comply with public health control measures. The sample was randomly selected using an electronic database and printed telephone directories to ensure sample representativeness from all Australian states and territories. After we described pandemic influenza to the respondents to ensure they understood the significance of the issue, the questions on compliance were repeated and changes in responses were analysed with McNemar’s test for paired data.

Findings Only 23% of the 1166 respondents demonstrated a clear understanding of the term “pandemic influenza”. Of those interviewed, 94.1% reported being willing to comply with home quarantine; 94.2%, to avoid public events; and 90.7%, to postpone social gatherings. After we explained the meaning of “pandemic” to interviewees, stated compliance increased significantly (to 97.5%, 98.3% and 97.2% respectively). Those who reported being unfamiliar with the term “pandemic influenza,” male respondents and employed people not able to work from home were less willing to comply.

Conclusion In Australia, should the threat arise, compliance with containment measures against pandemic influenza is likely to be high, yet it could be further enhanced through a public education programme conveying just a few key messages. A basic understanding of pandemic influenza is associated with stated willingness to comply with containment measures. Investing now in promoting measures to prepare for a pandemic or other health emergency will have considerable value.

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. These control measures are reflected in the Australian Health Management Plan for Pandemic Influenza. However, compliance with this approach is dependent on community understanding of the required control measures and their value in disease mitigation. Historical records show that if NPIs are promptly implemented during pandemics, disease transmission can be reduced, an observation supported by mathematical modelling.

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 \( \alpha \) 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). 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 concentration 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. Results are presented as odds ratios (ORs) and their 95% confidence intervals (CIs).

Results
The estimated resident Australian population for 2006 was used to assess the representativeness of the study sample. There were more females (61.6%) than males and older age groups were moderately over-represented, but graphically 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. 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:
1. 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);
2. if the disease “(a) could spread within a single country; or (b) spread through all countries” – 86.5% answered correctly (b);
3. 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);
4. 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).

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).

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 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. 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.

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. The level of compliance may be influenced through the provision of accurate information delivered within a structured communication programme. 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

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

<table>
<thead>
<tr>
<th>Question</th>
<th>Before</th>
<th></th>
<th>After</th>
<th></th>
<th>Percentage point change (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. If told you might have had contact with pandemic influenza, would you stay home 7–10 days to avoid exposing others?</td>
<td>Yes 94.1 % 5.9</td>
<td>No 97.5 % 2.5</td>
<td></td>
<td></td>
<td>3.4 (2.2–4.6)</td>
</tr>
<tr>
<td>2. If told you needed to avoid public events, would you?</td>
<td>Yes 94.2 % 5.8</td>
<td>No 98.3 % 1.7</td>
<td></td>
<td></td>
<td>4.1 (2.9–5.4)</td>
</tr>
<tr>
<td>3. If told you needed to postpone social gatherings, would you?</td>
<td>Yes 90.7 % 9.3</td>
<td>No 97.2 % 2.8</td>
<td></td>
<td></td>
<td>6.5 (4.9–8.0)</td>
</tr>
</tbody>
</table>

CI, confidence interval.
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

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Table 2. Stated intention to comply with home quarantine following exposure to pandemic influenza in a sample of Australian adults surveyed by telephone, 2007

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>n</th>
<th>Compliance %</th>
<th>Non-compliance %</th>
<th>Univariate models predicting non-compliance OR (95% CI)</th>
<th>Final multivariable models predicting non-compliance OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>448</td>
<td>92.2</td>
<td>7.8</td>
<td>2.1 (1.3–3.4)</td>
<td>2.0 (1.3–3.1)</td>
</tr>
<tr>
<td>Female</td>
<td>718</td>
<td>95.3</td>
<td>4.7</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Age, in years*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18–39</td>
<td>249</td>
<td>93.2</td>
<td>6.8</td>
<td>2.1 (1.0–4.5)</td>
<td></td>
</tr>
<tr>
<td>40–64</td>
<td>600</td>
<td>93.5</td>
<td>6.5</td>
<td>1.7 (0.8–3.7)</td>
<td></td>
</tr>
<tr>
<td>65+</td>
<td>316</td>
<td>95.9</td>
<td>4.1</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Highest education level*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University</td>
<td>283</td>
<td>93.6</td>
<td>6.4</td>
<td>1.0 (0.5–1.8)</td>
<td></td>
</tr>
<tr>
<td>Technical college</td>
<td>272</td>
<td>94.5</td>
<td>5.5</td>
<td>0.9 (0.5–1.7)</td>
<td></td>
</tr>
<tr>
<td>Year 11 or 12</td>
<td>196</td>
<td>92.9</td>
<td>7.1</td>
<td>1.0 (0.5–1.9)</td>
<td></td>
</tr>
<tr>
<td>Primary to year 10</td>
<td>414</td>
<td>94.7</td>
<td>5.3</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>832</td>
<td>93.6</td>
<td>6.4</td>
<td>1.6 (0.9–2.8)</td>
<td></td>
</tr>
<tr>
<td>Rural/remote</td>
<td>334</td>
<td>95.2</td>
<td>4.8</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Children in household</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>772</td>
<td>94.0</td>
<td>6.0</td>
<td>1.2 (0.8–1.9)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>394</td>
<td>94.2</td>
<td>5.8</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Employment situation*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-employed, unable to work from home</td>
<td>29</td>
<td>79.3</td>
<td>20.7</td>
<td>7.3 (3.0–17.5)</td>
<td>4.9 (2.3–10.5)</td>
</tr>
<tr>
<td>Self-employed, able to work from home</td>
<td>105</td>
<td>97.1</td>
<td>2.9</td>
<td>0.6 (0.1–2.3)</td>
<td>0.6 (0.2–1.8)</td>
</tr>
<tr>
<td>Wage earner, unable to work from home</td>
<td>369</td>
<td>89.2</td>
<td>10.8</td>
<td>3.4 (1.9–6.0)</td>
<td>3.3 (2.0–5.4)</td>
</tr>
<tr>
<td>Wage earner, able to work from home</td>
<td>107</td>
<td>96.3</td>
<td>3.7</td>
<td>1.2 (0.4–3.2)</td>
<td>1.2 (0.5–2.8)</td>
</tr>
<tr>
<td>Not in paid employment</td>
<td>555</td>
<td>97.1</td>
<td>2.9</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Knowledge of pandemic flu</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Unsure/never heard of term”</td>
<td>649</td>
<td>92.9</td>
<td>7.1</td>
<td>2.8 (1.4–6.1)</td>
<td>3.0 (1.6–5.7)</td>
</tr>
<tr>
<td>“Yes,” &lt; 4 replies to questions correct</td>
<td>254</td>
<td>94.9</td>
<td>5.1</td>
<td>1.6 (0.7–3.9)</td>
<td>1.8 (0.8–3.7)</td>
</tr>
<tr>
<td>“Yes,” all 4 replies to questions correct</td>
<td>263</td>
<td>96.2</td>
<td>3.8</td>
<td>1.0</td>
<td>1.0</td>
</tr>
</tbody>
</table>

CI, confidence interval; NI, not included in the final model; OR, odds ratio.

* One person did not answer.
Connaissances sur la grippe pandémique et observance des mesures d’endiguement par les Australiens

**Objectif**

Etudier le niveau d’observance déclaré des mesures de santé publique contre la grippe pandémique et les facteurs influant sur la coopération des Australiens à l’endiguement de cette maladie.

**Méthodes**

Une enquête par entretien téléphonique assistée par ordinateur a été menée par des enquêteurs professionnels pour recueillir des informations sur les connaissances de la population australienne au sujet de la grippe pandémique et sur sa volonté de respecter les mesures de santé publique contre cette grippe. L’échantillon a été randomisé en utilisant une base de données électronique et des annuaires téléphoniques imprimés pour garantir la représentativité de cet échantillon à l’égard de tous les États et territoires australiens.

**Résultats**

23 % seulement des 1166 personnes interrogées ont manifesté une compréhension claire du terme « grippe pandémique ». Parmi les personnes interrogées, 94,1 % ont indiqué qu’elles étaient disposées à respecter la quarantaine à domicile, 94,2 % qu’elles éviteraient les événements publics et 90,7 % qu’elles différerait les rassemblements sociaux.

**Conclusion**

En l’absence de données spécifiques sur le comportement des Australiens en cas d’épidémie pandémique, notre étude apporte une contribution significative. Les résultats de cette recherche peuvent être utiles pour les professionnels de la santé et les responsables de la communication pour adopter une stratégie cohérente et efficace dans la préparation et la gestion de la pandémie. Les résultats montrent également que la compréhension des conséquences de la grippe pandémique et la volonté de respecter les mesures de santé publique sont élevées, ce qui suggère une grande coopération potentielle des Australiens.

**Résumé**

**Connaissances sur la grippe pandémique et observance des mesures d’endiguement par les Australiens**

**Objectif**

Étudier le niveau d’observance déclaré des mesures de santé publique contre la grippe pandémique et les facteurs influant sur la coopération des Australiens à l’endiguement de cette maladie.

**Méthodes**

Une enquête par entretien téléphonique assistée par ordinateur a été menée par des enquêteurs professionnels pour recueillir des informations sur les connaissances de la population australienne au sujet de la grippe pandémique et sur sa volonté de respecter les mesures de santé publique contre cette grippe. L’échantillon a été randomisé en utilisant une base de données électronique et des annuaires téléphoniques imprimés pour garantir la représentativité de cet échantillon à l’égard de tous les États et territoires australiens. Après avoir expliqué aux personnes interrogées ce qu’est la grippe pandémique et pour s’assurer qu’elles comprennent l’importance du problème, nous avons répété les questions relatives à l’observance des mesures et nous avons analysé les variations des réponses par le test de McNemar pour données appariées.

**Résultats**

23 % seulement des 1166 personnes interrogées ont manifesté une compréhension claire du terme « grippe pandémique ». Parmi les personnes interrogées, 94,1 % ont indiqué qu’elles étaient disposées à respecter la quarantaine à domicile, 94,2 % qu’elles éviteraient les événements publics et 90,7 % qu’elles différerait les rassemblements sociaux.
Resumen

Conocimientos sobre la gripe pandémica y cumplimiento de las medidas de contención en la población australiana

Objetivo Determinar el grado de cumplimiento declarado de las medidas de salud pública contra la gripe pandémica y estudiar los factores que influyen en la cooperación necesaria para controlar esa pandemia en Australia.

Métodos Entrevistadores profesionales llevaron a cabo una encuesta telefónica asistida por ordenador a fin de reunir información sobre los conocimientos del público australiano acerca de la gripe pandémica y su determinación de observar las medidas de salud pública adoptadas para controlarla. La muestra fue seleccionada aleatoriamente a partir de una base de datos electrónica y de guías telefónicas impresas para procurar que fuese representativa de todos los estados y territorios australianos. Tras explicar a los encuestados en qué consiste la gripe pandémica para que entendieran la importancia del tema, se repitieron las preguntas sobre el cumplimiento. La variación sufrida por las respuestas fue analizada mediante la prueba de McNemar para datos apareados.

Resultados Sólo un 23% de los 1166 encuestados demostraron comprender cabalmente lo que supone una «gripa pandémica».

Entre los entrevistados, un 94,1% manifestó estar dispuesto a cumplir una cuarentena domiciliaria; el 94,2%, a evitar actos públicos; y el 90,7%, a aplazar encuentros sociales. Después de haber explicado a los entrevistados el significado del término «pandemia», el cumplimiento declarado aumentó significativamente (al 97,5%, 98,3% y 97,2% respectivamente). Los que manifestaron no conocer bien la expresión «gripa pandémica» los encuestados varones y los empleados que no podían trabajar desde su domicilio se mostraron más reacios a seguir las recomendaciones.

Conclusión En Australia, si se materializase la amenaza, el cumplimiento de las medidas de contención contra la gripe pandémica sería probablemente alto, no obstante lo cual podría mejorar mediante un programa de educación del público que transmitiera simplemente unos cuantos mensajes clave. Unos conocimientos básicos sobre la gripe pandémica se asocian a la voluntad declarada de cumplir las medidas de contención. Invertir ahora en promover medidas de preparación para una pandemia u otra emergencia sanitaria constituye una opción beneficiosa.
References


