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Increasing the intent to receive a pandemic influenza vaccination: Testing the impact of theory-based messages

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ABSTRACT

Objective. Vaccination is an effective preventive measure to reduce influenza transmission, especially important in a pandemic. Despite the messages encouraging vaccination during the last pandemic, uptake remained low (37.6% in clinical risk groups). This study investigated the effect of different types of messages regarding length, content type, and framing on vaccination intention.

Method. An online experiment was conducted in February 2015. A representative sample of 1424 people living in England read a mock newspaper article about a novel influenza pandemic before being randomised to one of four conditions: standard Department of Health (DoH) (long message) and three brief theory-based messages - an abridged version of the standard DoH and two messages additionally targeting pandemic influenza severity and vaccination benefits (framed as risk-reducing or health-enhancing, respectively). Intention to be vaccinated and potential mediators were measured.

Results. The shortened DoH message increased vaccination intention more than the longer one, by increasing perceived susceptibility, anticipated regret and perceived message personal relevance while lowering perceived costs, despite the longer one being rated as slightly more credible. Intention to be vaccinated was not improved by adding information on severity and benefits, and the health-enhancing message was not more effective than the risk-reducing.

Conclusion. A briefer message resulted in greater intention to be vaccinated, whereas emphasising the severity of pandemic influenza and the benefits of vaccination did not. Future campaigns should consider using brief theoretically-based messages, targeting knowledge about influenza and precautionary measures, perceived susceptibility to pandemic influenza, and the perceived efficacy and reduced costs of vaccination.

1. Introduction

Influenza pandemics are unpredictable phenomena, and their consequences can be severe, with a potential to cause millions of deaths worldwide and compromise social and economic wellbeing (WHO, 2013). In contrast to seasonal influenza epidemics, influenza pandemics emerge from a variant of a virus entirely novel to humans or not having circulated for several decades. As a result, the world population has little or no immunity to the virus, which can cause severe, sometimes life-threatening, illness. Vaccination is the most effective precautionary measure against influenza pandemics (WHO, 2012), but its success relies on the public's decision to be vaccinated. Despite extensive media campaigns, data from different countries show that during the 2009 influenza A (H1N1) pandemic most people did not get vaccinated, even those with chronic diseases (CDC, 2011; Mereckiene et al., 2012).

In a future outbreak, communication with the public will be key for encouraging vaccination uptake. Communication will need to be informed by evidence and theory from behavioural science (Michie and Abraham, 2004), and be systematically evaluated (Yardley et al., 2015). Therefore, we tested theory-guided and evidenced-based health messages promoting vaccination uptake to determine their persuasiveness in advance of a future pandemic. More specifically, we compared, in relation to a health message used in 2009–10 campaign against A(H1N1) influenza, the effectiveness of shorter messages and explored whether further addressing other theoretical constructs relevant for vaccination may contribute to increased vaccination uptake and how vaccination benefits should be framed.

1.1. Health message length

The degree to which arguments in a message are scrutinised depends on both motivation (e.g., relevance of the issue) and ability (e.g., cognitive resources, time) of the message recipient (Petty and Cacioppo, 1986). Thus, even if individuals are motivated, they may not

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have the cognitive resources or the time to process the message in great depth. Thus, the longer a message is, the more likely it is to be processed superficially (Petty and Cacioppo, 1984), with the number of arguments working as a peripheral cue to persuasion (Calder et al., 1974) and message content having a lesser impact on attitude change. Accordingly, shorter messages are more likely to be recalled (Gerver, 1969) and have a greater impact on behaviour change (Noar et al., 2007).

1.2. Health message content

A number of social-cognitive antecedents of vaccination uptake that can be targeted by health messages have been identified (see Bish et al., 2011; Brien et al., 2012 for reviews). Believing the pandemic influenza is serious and that one is personally at risk (Brewer et al., 2007; Marcu et al., 2015) and perceiving vaccination as beneficial and protective against pandemic influenza as well as a means of avoiding spreading the infection to others (Han et al., 2016; Rubinstein et al., 2015) have been identified as vaccination uptake facilitators. Factors associated with reduced intention to be vaccinated are: being sceptical about the threat posed by pandemic influenza (Rubin et al., 2015; Rubin et al., 2010), thinking that pandemic influenza is similar to seasonal influenza, which is not considered to be a serious illness (Rubinstein et al., 2015), perceptions of being healthy and having a strong immune system (Han et al., 2016; Rubinstein et al., 2015), and having concerns around the safety of the vaccine, such as fearing eventual side effects (Sypsa et al., 2009).

Based on people's prior experience with the A(H1N1) virus, which was less severe than others from previous pandemics (WHO, 2013) and perceived as a mild threat (Bish et al., 2010), it is likely that the risk of a future pandemic will be initially perceived as relatively low. Thus, it has been suggested that, in order to increase the public willingness to vaccinate, health messages need to focus on the severity of pandemic influenza (Bish et al., 2010). However, this information should be followed by the benefits of vaccination, as high levels of fear and arousal produced by risk messages can undermine their motivational effect as a result of avoidance and/or denial responses (Peters et al., 2013).

1.3. Framing of benefits

Although the benefits of vaccination are often presented in relation to disease prevention (*risk-reducing* benefits), benefits can also be framed in relation to health promotion (*health-enhancing* benefits). Recent studies have suggested that highlighting the health-enhancing benefits of vaccination, such as strengthening the immune system, may be more effective than emphasising the reduced risk of infection (Rubinstein et al., 2015; Teasdale et al., 2014).

1.4. The present study

This study aimed to evaluate evidence- and theory-based messages promoting uptake of vaccination for pandemic influenza in the context of an uncertain pandemic influenza scenario, and investigate psychological explanations of message effectiveness. Despite the existence of a wealth of observational and correlational studies on pandemic influenza vaccination, considerably fewer studies have experimentally evaluated the effectiveness and change process of theory-based health messages for the promotion of vaccination uptake (see McGlone et al., 2013 and Payaprom et al., 2011, for exceptions). Moreover, to our knowledge, no other study has done so using a representative sample of the population, which is relevant considering the demographic variations in vaccination intentions and uptake.

Intention to be vaccinated was used as a proxy measure for behaviour on the basis of evidence of its predictive power in the context of single action behaviours (Sheeran, 2002), such as vaccination (Lehmann et al., 2014; Renner and Reuter, 2012). Psychological predictors of vaccination uptake were measured to test the mechanisms responsible for differential effects across different health messages on vaccination intentions.

We predicted that:

1) A briefer message (one page long) would lead to higher intentions to be vaccinated than a longer one (12 pages long).
2) Emphasising the severity of pandemic influenza and benefits of vaccination would contribute to an increase in the intention to be vaccinated.
3) A message focusing on the health-enhancing (rather than risk-reducing) benefits of vaccination would be more effective.

2. Method

2.1. Study design

After reading the study objectives and providing their informed consent, participants were requested to read a mock newspaper article describing an uncertain influenza pandemic. They were informed that it was fictitious, but were asked to imagine themselves in that situation. They then answered one question measuring their baseline intention to be vaccinated and were randomised to one of four conditions: 1) DoH message, 2) Shortened DoH message, 3) Shortened risk-reducing message, or 4) Shortened health-enhancing message.

2.2. Participants

A representative sample in relation to age, gender and geographic location of adults living in England was recruited through a market research company online panel (see Supplementary File 1 for details on recruitment procedures). Participants were required to be fluent in English and to be aged between 16 and 75.[1] The sample size was calculated using G*Power (Faul et al., 2009) to give 80% power to detect a statistically significant difference at $\alpha = 0.05$, if an effect size of 0.1 or higher was observed, adjusting for one covariate, and inflated by 30%, given the possibility of drop-out.

2.3. Materials

2.3.1. Pandemic influenza scenario

This was a mock news item, based on one used by Rubinstein et al., 2015 (see Appendix A). The use of an uncertain, moderate scenario relied on previous research showing this methodology to be valid (Wright et al., 2006) and that under a severe pandemic scenario the majority of people would accept vaccination (Rubinstein et al., 2015; Teasdale et al., 2012).

2.3.2. Health messages

The *DoH Message* (condition 1), was an amended version of the 12-page leaflet used by the DoH in the 2009–10 pandemic, where "swine flu" was substituted with "a new flu strain" and medication names with dummy labels. The other three messages were created to look similar to the posters used in 2009–2010, including similar visual lay out and images, and the same tag line and logos (see Supplementary File 2). We were explicit about the source of information, a factor known to be important for message credibility (Quinn et al., 2013).

The *Shortened DoH message* (condition 2) contained only the key information selected from the 12-page leaflet. It targeted known vaccination predictors: knowledge about flu and precautionary measures, perceived susceptibility, perceived costs (emphasising low risk of side-effects and vaccine safety) and vaccine efficacy. *Shortened risk-reducing message* (condition 3) presented the vaccine as a way of reducing the

[1] The upper age limit was set up at 75 years as only 37% of people aged 75 or more use the internet whereas in other age groups this percentage is above 70% (Office for National Statistics, 2014).