



Patient Perception from Internet on Adverse Effects vs Benefits of Vaccination - An Internet Message from a Public Figure in Hong Kong

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Introduction

Influenza viruses are important human respiratory pathogens that can cause seasonal influenza epidemics and out-of-season sporadic cases and outbreaks. Influenza occurs globally with an annual attack rate estimated at 5%-10% in adults and 20%-30% in children [1]. Yet, a message on Internet during winter peak of 2018 influenza has provoked widespread discussion in Hong Kong regarding vaccination [2,3].

From February 07, 2018 [2,3], a 5-minute voice message has appeared on Internet forum. It is released by a Hong Kong celebrity in private discussion and uploaded by other people on a parents' forum which then spread through Internet, in which the content mainly focuses on the harmful ingredients like mercury and aluminum, bacteria existence may cause iatrogenic disease, mutation of bacteria due to human and animal DNA mixing, high risk and low effectiveness of vaccination [4].

Widespread of the message through Internet led to intense public discussion regarding the issue, and various healthcare professionals have responded to the event in announcement [5] and news [6-11], including government official [5], legislator [6,7], and professor [8-11]. The vigorous debate among various groups transformed the issue into an event of societal level.

Content of the Internet voice message

The voice message on internet raised several questions regarding influenza vaccination [4]:

1. The vaccine contains mercury and aluminum as part of the composition
2. Scientists "gamble" about the type of influenza virus by chance
3. The vaccine is produced by injecting bacteria into chicken's body and then the eggs contain the bacteria, such mixture of human and animal DNA cause mutation
4. The bacteria become "super-bacteria" after the injection into human body and cause iatrogenic illness of a healthy person.

These claims have raised vigorous public concern and discussion, which may lead to discouragement of vaccination by the public.

Response from various medical professionals

A group of medical professionals responded quickly after the spread of voice message on Internet.

Composition

A group of medical professionals stated on Internet that all Hong Kong independently packaged single-dose seasonal influenza vaccines does not contain thimerosal [12].

Effectiveness of vaccine

A statement from the Department of Health claimed that this season's vaccine strains closely match the influenza viruses that are circulating this winter influenza season in Hong Kong [5].

The animal-based vaccine would not cause adverse events to host

A news article mentioning the opinion of Professor YUEN of the University of Hong Kong state that the vaccine is injected to the egg and the production is based on the embryo of chicken. The virus is then killed and followed by isolation and purification of antigens. Thus most of the vaccines are purified. The amount of remaining egg white is negligible and is harmless [10,11].

Patients' perception is strongly affected by Internet information

Internet exposure can significantly affect patient perception of vaccination. Viewing typical vaccine-critical websites for only 5-10 minutes increases the perception of risk regarding vaccinations and decreases the perception of risk regarding the omission of vaccinations as compared to visiting a control site [13].

The exposure to information including from Internet may be associated with negative effect on public's perception towards healthcare programmes, such as vaccination. General public objects to vaccination due to fear of adverse effect, perception of insufficient test, 'public panicking', necessity, and lack of information of vaccine [14].

Mistrust towards the authorities (government, public health professionals) also plays a role in vaccine hesitancy, as parents who did not fully vaccinate their children held feelings of distrust towards government [15].

Vaccination perception is negatively affected by exposure to Internet information, as parents and general public tend to be negatively influenced by Internet opinion regarding vaccination safety, and current initiatives aiming to reach and influence parents' decision to vaccinate have not adequately abated the influence of the online anti-vaccination movement [16].

Health education and promotion about vaccination

Individual level

Parents' decision regarding vaccination mainly depends on physician recommendation, effectiveness and risk of temporary side effects (presence of mercury-containing preservative) [17]. Diffusion of negative information online and lack of knowledge about vaccines were identified as the key causes of vaccine hesitancy [18]. A study suggested that for individual-based health education, a medical consultation regarding information about influenza vaccination and a clear recommendation by the presenting physician is a strong factor on accepting vaccination [19].

At the primary care practitioner level, parental education on influenza vaccine regarding efficacy and safety may also help to improve pediatric vaccination rates. General public often weighs vaccine effectiveness heavily [17], and physicians should provide sufficient information to general public before making decision on vaccination. For example, physicians should state there are varying effectiveness of vaccinations season in various countries, and effectiveness of vaccine against influenza A and B in 2017-2018 season is reported to be 36% in US [20].

Medical professionals should well-educate public regarding the use of preservatives in vaccine. Physicians may inform general public the existence of thimerosal, and that it is very unlikely to cause adverse outcomes [21]. Also, the peak body mercury burdens after exposure to thimerosal-containing vaccines did not exceed the maximum burden of mercury even in underweight infants [22].

Physicians may also educate general public on egg allergy in view of vaccine hesitancy. Before vaccination, relevant medical history of allergy should be well-obtained, and potential allergic risk should be well-explained. Egg-related severe allergic reaction is extremely rare, as anaphylaxis after vaccination is rare in all age groups [23]. A study stated that egg-based trivalent influenza vaccine can be safely administered even in children with severe egg allergy [24].

Community based

The event provides a good example for the tremendous effect of mass media, such as Internet, on general public perception and hence affect population health in terms of healthcare coverage.

As general public opinion on Internet may produce great effect on public perception towards vaccination, there might be a need of public health intervention through effective ways using Internet and online resources [16].

General public, especially adolescents, does not show enough sophistication of appraisal skills to correctly judge on information from Internet sources, and some even does not search on Internet to verify information. Public tends to be affected by first-impression of information on Internet [25], tends to judge information based on instinctive response [25], as well as tends to believe in majority of websites if in doubt, instead of critically appraising the material [26]. Mcpherson, *et al.* also stated that many people require greater skills for assessing the quality and trustworthiness of online health information [26].

It is thus encouraged for the public to learn to verify Internet information through database search in order to acquire better searching and critical appraisal skills, as the establishment of accurate and authoritative online healthcare database may enhance general public medical knowledge [27]. It is also suggested that healthcare professionals should consider to promote population health programmes through Internet. Parents nowadays are more affected by information from Web sites and electronic means of communication [28].

Conclusion

The event is thus a good reminder for authorities, including government and medical professionals, to notice the importance and powerfulness of Internet information spread among general public, which may have tremendous effect on public perception and decision-making regarding healthcare programmes including seasonal influenza vaccination. We suggest there is a need to strengthen public health education through Internet materials, as well as guidance to appraise information, and the education material should focus on vaccine effectiveness and clarifying the misunderstandings of vaccination.

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