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Public Health

journal homepage: www.elsevier.com/puhe

Short Communication

Association between socio-economic status indicators and adoption of preventive measures for influenza among Beijing residents: a cross-sectional study

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ARTICLE INFO

Article history:
Received 21 December 2015
Received in revised form
20 April 2016
Accepted 25 May 2016
Available online 21 June 2016

Introduction

Influenza is a virus that affects millions of people globally throughout the year. Beijing is a temperate city with a large, dense population where influenza circulates seasonally every year. During the 2009 influenza pandemic, an estimated 1.5–2.3 million people were infected with pandemic influenza A(H1N1) pdm09 virus in Beijing, with an overall infection rate of 10.6%.[1]

Given the burden of influenza, health authorities recommend preventive measures to reduce its threat to public health. Among these measures, vaccination is considered to be the most beneficial,[2] and the effectiveness of non-pharmaceutical interventions (NPIs), such as wearing face masks and practising intensive hand hygiene, is also recognized.[3,4]

Socio-economic status (SES) is associated with the adoption of preventive care measures.[5] Several studies conducted in Beijing have estimated the prevalence of influenza vaccination coverage and the use of masks by hospital clinicians, but the results varied due to differences in subject selection. For example, one study showed that the prevalence of vaccination among patients with influenza-like illness (ILI) was only 4%,[6] whereas the figure for older residents was approximately 41%–44%.[7] Previous studies focussed on a specific population, such as healthcare workers (HCWs) or patients,[8] whereas the prevalence rate of vaccination and adoption of NPIs in the general population remains underinvestigated.

This study aimed to explore the prevalence of influenza vaccination, use of masks in hospitals and intensive hand hygiene. This study also investigated the association between SES indicators and each preventive measure. The findings of this

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http://dx.doi.org/10.1016/j.puhe.2016.05.022

study will provide preliminary data on the acceptance of the preventive measures by the general population and associations with SES. The results will contribute to the risk assessment on the adoption of preventive measures during an influenza pandemic.

A survey was conducted through door-to-door interviews from December 2013 to January 2014, using an anonymous self-administered paper-based questionnaire to gather data on SES and the adoption of measures for influenza prevention. SES was categorized using income, occupation and highest education level as proxy measures. Resident registration status and health insurance status were also considered as proxies for social position. Preventive measures included the use of masks in hospital, influenza vaccination and hand hygiene. Vaccination was defined as receipt of the influenza vaccine within the past year, and was based on self-report. People were considered to use masks in hospital if they had done so on ≥80% of occasions when they visited hospitals after developing ILI or when accompanying a sick person with ILI symptoms. Hand hygiene was defined as washing hands ≥80% of the time after being outside. In total, 7121 questionnaires were retrieved from 7369 respondents (49.2% males, age range 18–92 years, mean age 45 years). The percentages of people that adopted the preventive measures were categorized by demographic class. Multivariate logistic regression analysis was employed to assess the associations between SES indicators and adoption of preventive measures, creating independent models for each preventive measure and enabling the authors to control for age and sex.

Adoption rate of preventive measures

Table 1 shows the prevalence rates of adoption of preventive measures in different sociodemographic groups. It can be seen that the average influenza vaccination coverage was relatively low in Beijing (21.8%). In comparison, the use of hospital masks (55.9%) was much higher than vaccination coverage, and hand hygiene (90.6%) was the most popular type of preventive care among the three measures.

Association between SES and adoption of preventive measures

There were discrepancies in the adoption of preventive measures between sociodemographic groups. In general, the prevalence rates were higher in people with high social status than those with low social status, but the rates were not associated with economic status.

Aside from the influence of the free-of-charge vaccination policy for elderly people registered to a household in Beijing and school students, influenza vaccination status was also associated with household registration status, occupation type and medical insurance status. Urban residents of Beijing, rural residents of Beijing, and urban immigrants (i.e. Chinese people without a registered household in Beijing, but who have lived in Beijing for more than 6 months) were more likely to report uptake of the influenza vaccine compared with rural immigrants (adjusted OR 3.07, 2.85 and 1.84, respectively). HCWs (adjusted OR 2.65) and subjects with health insurance (adjusted OR 1.65) were more likely to be immunized than farmers and subjects without health insurance.

The use of a mask in hospital was associated with education level, household registration status, occupation type and health insurance status. A significant trend for increasing the use of masks in hospital was observed with education level (P for trend <0.001). Urban residents of Beijing were more likely to wear masks than rural immigrants (adjusted OR 1.51). Compared with farmers, the adjusted ORs for commercial enterprise staff, governmental staff and HCWs were 1.21, 1.45 and 2.81, respectively. The adjusted OR for people with health insurance compared with people without health insurance was 1.75.

The practice of intensive hand hygiene increased with education level: compared with illiterate individuals, the adjusted ORs for those with primary school, junior school, high school, and university and above educational levels were 1.92, 3.58, 5.27 and 6.09, respectively (P for trend <0.001). The practice of hand hygiene was significantly better among urban residents of Beijing (adjusted OR 2.56) and rural residents of Beijing (adjusted OR 1.73) compared with rural immigrants.

Discussion

This study had three main findings. First, the vaccination coverage rate in Beijing is unsatisfactory. This is a risk factor in response to the influenza pandemic. Although the vaccination rate in the elderly (48.8%) was higher than the vaccination rates in other age groups due to the free-of-charge vaccination administration policy, it was still much lower than the World Health Organization's target level of 75%.[9] Influenza-related mortality is highest in the elderly,[10] so it is important to raise awareness about the benefits of influenza vaccination and to encourage cooperation among healthcare providers, professional organizations and public health departments in order to further raise the vaccination rate in the high-risk population.

Second, this study found that the adoption of individual NPIs was higher than the uptake of vaccination. With more than half of the respondents reporting the use of a mask in hospital, it may be possible to reduce the risk of nosocomial infections further if the proper type of mask is used.

Third, higher social status was found to be associated with better health behaviours. Interestingly, the adoption rates of all three preventive measures were associated with census registration status. Beijing, one of the most populous cities in China, has a large proportion of people who moved there from other provinces, and who have very low SES. Therefore, it is necessary to strengthen health education to these people in order to limit the transmission of influenza and other respiratory diseases.

The study had some limitations. First, the authors were unable to use an integrated indicator to reflect SES. There is no recognized standard measure of SES in China, and indicators generated in other countries may not be applicable. Therefore, the results are presented for each specific indicator.

Second, the proportion and distribution of the study sample do not coincide with the population in Beijing because of the sampling design. There was a lower proportion of people who were not household residents in Beijing among the study respondents compared with the overall population, so the average adoption rate gathered from this study may be an