Family Practice Vol. 20, No. 2 © Oxford University Press 2003, all rights reserved. Printed in Great Britain
Doi: 10.1093/fampra/20.2.162, available online at www.fampra.oupjournals.org

Influence of family on acceptance of influenza vaccination among Japanese patients

Osamu Takahashi, Yoshinori Noguchi, Mahbubur Rahman, Takuro Shimbo, Masashi Goto, Kunihiko Matsui, Atsushi Asai[a], Motoki Onishi, Hiroshi Koyama, Izumi Sawada[b], Takeshi Yoshinaka[b] and Tsuguya Fukui

Takahashi O, Noguchi Y, Rahman M, Shimbo T, Goto M, Matsui K, Asai A, Onishi M, Koyama H, Sawada I, Yoshinaka T and Fukui T. Influence of family on acceptance of influenza vaccination among Japanese patients. *Family Practice* 2003; **20:** 162–166.

Background. Influenza is a major cause of morbidity and mortality in Japan and worldwide, especially for people of >65 years old and those with high-risk medical conditions. Although the influenza vaccine is effective in reducing the morbidity and mortality, the vaccine coverage rate has not increased adequately in Japan, compared with western countries.

Objective. Our aim was to assess whether medical and personal characteristics are associated with receiving influenza vaccination in Japanese patients.

Methods. Out-patients of a city hospital were recruited for a case–control study between November 1998 and February 1999. Cases were 98 out-patients aged 18 years or older who received influenza vaccination. Controls were 112 non-vaccinated out-patients matched with cases for primary physician and date of clinic visit. The candidates were interviewed by telephone and asked to respond to a 26-item questionnaire. The data were analysed using multiple logistic regression models.

Results. The factors associated with the acceptance of influenza vaccination were: (i) recommendation by a family member and/or a close friend [odds ratio (OR) 17.74; 95% confidence interval (CI) 1.95–161.77]; (ii) belief in influenza vaccine efficacy (OR 10.55; 95% CI 3.42–32.49); (iii) having a family member and/or friends who had been vaccinated before (OR 6.44; 95% CI 2.37–17.50); (iv) physician's recommendation (OR 4.03; 95% CI 1.42–11.37); and (v) knowledge about the influenza vaccine (OR 3.06; 95% CI 1.02–9.20). Fear of adverse reactions (OR 0.21; 95% CI 0.07–0.66) was the sole factor associated with non-acceptance of influenza vaccine.

Conclusion. Patients in Japan are likely to be greatly influenced by their family members or close friends in their decision of whether to accept influenza vaccination, unlike US patients who make health care decisions on their own. When implementing an influenza vaccination programme, this effect of cultural background observed in Japan should be taken into account in other countries.

Keywords. Cross-cultural, decision making, family, influenza vaccination, Japan.

Introduction

The inactivated influenza vaccine is safe, effective and probably the most important tool in reducing morbidity, mortality and economic losses due to influenza.[1,2] Many western countries have drawn up guidelines to improve the rate of influenza vaccination. In these countries, annual influenza vaccination is recommended for all people aged 65 years or older and those with high-risk medical conditions, such as chronic heart disease, renal disease, chronic respiratory disease, diabetes mellitus

Received 2 April 2002; Revised 7 August 2002; Accepted 4 November 2002.
Department of General Medicine and Clinical Epidemiology, [a]Department of Biomedical Ethics, School of Public Health, Kyoto University Graduate School of Medicine and [b]Kyoto Hoken-Kai Kamigyo Hospital, Japan. Correspondence to Tsuguya Fukui, Department of General Medicine and Clinical Epidemiology, Kyoto University Graduate School of Medicine, 54 Kawahara-cho, Shogoin, Sakyo-ku, Kyoto 606-8507, Japan; E-mail: fkts@kuhp.kyoto-u.ac.jp

and immunocompromised state.[3] The rate of influenza vaccination in the USA increased steadily throughout the 1990s, reached a level of 281 doses per 1000 population in 1997, almost double that of 1992; and, in the UK, ~30 vaccine doses distributed per 1000 population in the early 1980s grew to well over 100 vaccine doses per 1000 population in the 1990s.[3]

In contrast, in Japan, the influenza vaccination rate declined dramatically throughout the 1980s and 1990s. It was very high, ~280 doses per 1000 population, in the early 1980s. This was due mostly to mandatory influenza vaccination programmes for school children. In 1994, most of these programmes were discontinued because of controversies about its effectiveness,[4] and widely reported lawsuits alleging adverse side effect of influenza vaccination. The rate plunged to only two and eight doses per 1000 population in 1994 and 1995, respectively.[4]

However, >1000 patients, mostly elderly, died of influenza in the 1999/2000 winter seasons in Japan.[5] By that time, the high efficacy of influenza vaccine without a severe adverse reaction had already been shown for elderly persons[6] in Japan. Recently, awareness of the efficacy of influenza vaccination has been growing.

The Ministry of Health, Labour and Welfare of Japan has changed their policy on influenza vaccination from mass prevention to individual prevention.[7] As a result, the guideline for influenza vaccination was reintroduced from the 2001/2002 season recommending vaccination for all people aged 65 years or older and patients with high-risk medical conditions.[7] The immediate object of the guideline is to raise the vaccine coverage rate to the level of western countries.[7]

There are some studies that have been carried out evaluating factors that play a role in decision making about receiving influenza vaccine in the USA and some other western countries. The important factors influencing receipt of the influenza vaccine are (i) the medical provider's recommendation; (ii) belief in the efficacy of influenza vaccine; and (iii) belief in the absence of adverse effects of influenza vaccine.[8–10]

To raise the influenza vaccine coverage rate in Japan, it is essential to elicit factors associated with the acceptance or refusal of influenza vaccination.

Methods

Cases

Cases comprised 123 out-patients who attended an ambulatory clinic of a Community Hospital in Kyoto, Japan, from November 1998 to February 1999. Inclusion criteria were: (i) 18 years of age or older; and (ii) acceptance of influenza vaccination between November 1998 and February 1999. Out of 123 patients, 21 could not be reached by telephone, three refused to participate, and one had died.

Controls

Patients who had attended the same clinic as out-patients in the same period of time were recruited as controls matched (with the ratio of 1:2) to cases by physician and date of visit. Controls were not matched by age and sex because these have already been shown in previous studies not to be important factors.[8] Inclusion criteria were: (i) 18 years of age or older; and (ii) non-acceptance of influenza vaccination between November 1998 and February 1999. Out of 196 patients, 52 could not be reached by telephone, 30 refused to participate, and two had died.

The sample size was calculated with a significance level of 0.05 and a power level of 0.80. Effect size, 20%, is specified by the difference between the proportion of cases expected to have a particular risk factor and that of controls, which was inferred from the pilot study. The required sample size was calculated to be 91 in each group for a total of 182.

Data collection

Information on cases and controls was obtained by five trained research assistants by telephone interview. The questionnaire was a compilation of questions from varying sources including those by Nicholas *et al.*[8] Interviewers, cases and controls were all blinded regarding the hypothesis of this study. In addition, all the interviewers were blinded regarding the status of the cases and controls in order to reduce observation bias. The cases and controls were asked to respond to a 26-item questionnaire after providing informed consent. In addition to socio-demographic variables, the items of interest included knowledge, attitudes and beliefs about influenza vaccination and health. The questionnaire was constructed and pre-tested in 10 patients.

Statistical analyses

We performed all statistical analyses with the use of SAS.[11] Categorical data were contrasted using chi-square test; when the expected value of a cell was <5, Fishers exact test was used. To compare continuous data, the Student's *t*-test was used for normally distributed variables; otherwise, the Mann–Whitney U-test was used. The effect of each item in the questionnaire on acceptance of influenza vaccination was analysed with the aid of a multiple logistic regression model. Age, sex and variables with a *P*-value of <0.25 on univariate analysis[12] were entered into the multiple logistic regression model (Table 1). A *P*-value of ≤0.05 was considered statistically significant.

Results

Comparative features of cases (n = 98) and controls (n = 112) are listed in Table 1. Cases and controls were nearly identical regarding co-morbidity (P = 0.97), worry about injection (P = 0.87), other preventive measures

TABLE 1 *Comparative features of cases and controls*

Patient characteristics	Cases (n = 98)	Controls (n = 112)	Odds ratio (95% CI)	P-value
Sex				
Female (%)	73.5	60.8		0.05
Average age (years) ± SD	71.0 ± 16.0	68.7 ± 11.2		0.24
Living alone (%)	24.7	20.9		0.52
Current smokers (%)	11.2	19.8		0.09
Answers to the questionnaire				
Follow doctors' advice (%)	97.9	93.8	3.1 (0.64–15.5)	0.14
Has severe co-morbidity (%)	40.8	41.1	1.0 (0.57–1.7)	0.97
Visit to physician in the last month				
⩾4 times (%)	20.4	13.3	1.7 (0.80–3.5)	0.17
Worried about influenza (%)	27.4	16.1	2.0 (1.0–3.8)	0.048
Worried about the cost of vaccine (%)	61.5	75.0	0.53 (0.29–0.95)	0.04
Scared about injection (%)	19.4	20.5	0.93 (0.47–1.8)	0.87
Had adverse reaction after vaccination (%)	5.0	0.9	6.0 (0.69–52.0)	0.10
Relative or friends received influenza vaccine this year (%)	50.5	12.6	7.1 (3.6–14.1)	0.001
Advised to get vaccinated (%)				
By doctor	38.8	11.6	4.8 (2.4–9.8)	0.001
By nurse	13.3	3.6	4.1 (1.3–13.0)	0.01
By relatives or friends	25.5	1.8	18.7 (4.3–81.2)	0.001
Knowledge about influenza/vaccine (%)				
Heard about influenza vaccine	87.8	68.7	3.3 (1.6–6.7)	0.001
Know that it is recommended	34.7	28.6	1.3 (0.74–2.4)	0.34
Belief about influenza/vaccine (%)				
Vaccine can prevent influenza	92.9	52.7	11.7 (5.0–27.4)	0.001
Fear of adverse reactions	22.4	34.8	0.54 (0.29–1.0)	0.049
Other preventive habits (i.e. hand wash, gargle after coming home) (%)	54.1	50.9	1.1 (0.66–2.0)	0.64
Willing to have influenza vaccine in the coming year (%)	83.7	15.2	28.6 (13.6–60.3)	0.001

Cases, patients who received vaccination; controls, patients who did not receive vaccination.
Co-morbidity was defined as chronic heart disease, renal disease, chronic respiratory disease, diabetes mellitus and immunocompromised state.

employed (P = 0.64), age (P = 0.24), compliance with doctor's advice (P = 0.18), the number of previous clinic visits (P = 0.17), history of adverse reaction to the influenza vaccine (P = 0.10) and smoking status (P = 0.09) (Table 1). On the other hand, they were different regarding sex (P = 0.05), fear of adverse reactions (P = 0.049), worry about influenza (P = 0.048); getting advice from the nurse (P = 0.01), doctor (P = 0.001) and relatives (P = 0.001), having a relative or friend who was vaccinated for influenza in the previous year (P = 0.001),

knowledge of influenza vaccine (P = 0.001) and belief in the fact that influenza vaccine prevents influenza (P = 0.001) (Table 1). The non-interviewed group consisted of predominantly male (P = 0.002) and younger patients (P = 0.004).

Multiple logistic regression, which includes demographic and medical characteristics, showed that factors significantly associated with acceptance of influenza vaccine were: (i) recommendation by a family member and/or a close friend [odds ratio (OR) 17.74; 95% confidence interval (CI) 1.95–161.77]; (ii) belief in influenza vaccine efficacy (OR 10.55; 95% CI 3.42–32.49); (iii) having a family member and/or friends who had been vaccinated before (OR 6.44; 95% CI 2.37–17.50); (iv) physician's recommendation (OR 4.03; 95% CI 1.42–11.37); and (v) knowledge about the influenza vaccine (OR 3.06; 95% CI 1.02–9.20). On the other hand, a factor associated with non-acceptance of influenza vaccination was fear of adverse reactions (OR 0.21; 95% CI 0.07–0.66) (Fig. 1). Age was not found to be a predictor even after transforming it to a categorical variable (≥65, <65 years old).

Discussion

We found that the recommendation by a patient's family member and/or friends was an important factor for patients in deciding whether to receive influenza vaccination. 'Having a family member and/or friends who had been vaccinated' was also one of the most important factors for motivating patients to receive influenza vaccination. In the USA and some other western countries, family and friends were not significant factors in acceptance of influenza vaccination.[8–10] This might be due to the differences in cultural background between Japan and other countries. Japanese people are said to be more influenced by their family members than those in the USA in making difficult decisions in health care, such as the disclosure of a cancer diagnosis, withholding ventilation support and HIV testing.[13] Our results showed that the recommendations by family member are likely to influence the patients' decision not only at the end of life but also in routine medical care such as influenza vaccination. In Japanese society, individuals are structurally defined in relation to others,[14] and harmony with the group to which they belong is the most important virtue,[15] which is designated as 'relation-type ethical orientation'.[16] This feature is also observed in Southeast and other East Asian countries. On the other hand, 'autonomy-type ethical orientation' is found among people in the USA and some other western countries.[16] Furthermore, Japanese patients trust family members or friends and try to maintain harmony with them. A patient's belief in the efficacy of the influenza vaccine may be secondary to the harmony and consensus of their family.[14] In addition, they consider their role in family, business or society as an obligation.[15] The sense of obligation towards family is likely to determine the behaviour of patients.[17] Fetters designated it as the family-centred decision-making model in Japan.[14] The familial model of decision making is also common in many other cultures.[18] Interestingly, it has been reported that Korean-Americans (57%) and Mexican-Americans (45%) gave far greater weight to family preference in a medical care decision at the end of life than did European Americans (20%) or African Americans (24%).[19]

Moreover, we found that 'belief in the efficacy of the influenza vaccination' and 'knowledge about the influenza vaccine' were associated with acceptance, and 'fear of adverse reaction' was associated with non-acceptance, even though adverse reactions due to influenza vaccination were known to occur very rarely.[20] Based on these results, a mass awareness programme would play a significant role in raising the influenza vaccination rate.[9]

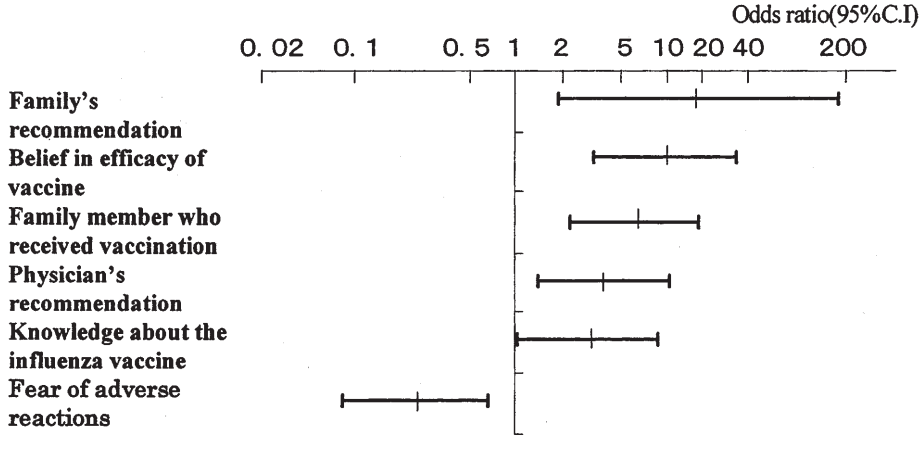

FIGURE 1 *Factors associated with acceptance of influenza vaccination (multiple logistic regression)*

Furthermore, a physician's recommendation was significantly associated with a patient's decision to receive influenza vaccination, in spite of the fact that control patients were matched to cases seen by the same physician. A physician's persuasiveness and enthusiasm may differ from patient to patient, and each party may have a different perception of what was discussed during the clinic encounter. After all, physician's recommendation appears to be an important factor in patients' decision to receive influenza vaccination, as shown in previous studies.[8–10]

There are several limitations to this study. First, non-responder bias, common in a questionnaire survey,[21] might have influenced the current results. Specifically, a number of patients who were not reached on the telephone were excluded from the analysis. Most of the respondents in this study were female and elderly. Although sex and age were not significant factors for receiving the influenza vaccine by multiple logistic regressions, other factors such as income, academic background and business experience could influence the results of this study. Secondly, the recall bias, common for a retrospective study, could be a problem in our study. The vaccinated patients are likely to remember their experiences differently from those who were not vaccinated. In this study, a physician's recommendation for influenza vaccination might have been recalled more vividly by cases. A prospective study is necessary to solve this problem. Thirdly, cases and controls were selected from a single hospital. This might hamper generalization of the results of this study to other population. Fourthly, a questionnaire survey by telephone was not formally tested for validity and reliability although its face validity was assessed by Nicholas *et al*. in a previous study.[8]

Finally, other confounding factors may have crept into our analysis. However, confounding factors leading away from the null hypothesis are unlikely given the direction of the change in the odds ratio estimated with univariate followed by multivariate analysis. The similarity of our findings to the results of previous studies suggests that the associations observed here are likely to reflect cause and effect relationships.[8–10]

In conclusion, family member and/or friends of patients, in Japan, have a significant influence on their decision of whether to accept influenza vaccination. This feature is different from that of patients in the USA and some western countries. However, since a similar human relationship is likely to exist at least in most of the Southeast and some East Asian countries, it could be reasonable to take into account the family and friend factors in order to raise the influenza vaccination rate in many countries.

Acknowledgements

This paper was presented at the 25th World Congress of Internal Medicine, Cancun, Mexico, June 7, 2000.

Reference

1 Gross PA, Hermogenes AW, Sacks HS, Lau J, Levandowski RA. The efficacy of influenza vaccine in elderly person: a meta-analysis and review of the literture. *Ann Intern Med* 1995; **123:** 518–527.

2 Govaert ME, Thijs TMCN, Masurel N, Sprenger JW, Dinant GJ, Knottnerus JA. The efficacy of influenza vaccination in elderly individuals. A randomized double-blind placebo-controlled trial. *J Am Med Assoc* 1994; **272:** 1661–1665.

3 Ambrosch F, Fedson DS. Influenza vaccination in 29 countries. An update to 1997. *Pharmacoeconomics* 1999; **16 (Suppl 1):** 47–54.

4 Hirota Y, Fedson DS. Japan lagging in influenza jabs. *Nature* 1996; **380:** 18.

5 *Population Survey Report in 1999/2000*. Ministry of Health, Labour and Welfare, Government of Japan [in Japanese].

6 Deguchi Y, Nishimura K. Efficacy of influenza vaccine in elderly persons in welfare nursing homes: reduction in risks of mortality and morbidity during an influenza A(H3N2) epidemic. *J Gerontol A Biol Sci Med Sci* 2001; **56:** 391–394.

7 *The Guidelines for the Influenza Vaccine in Japan 2001*. Ministry of Health, Labour and Welfare, Government of Japan [in Japanese].

8 Nicholas H, Fiebach MD, Catherine M, Viscoli M. Patient acceptance of influenza vaccination. *Am J Med* 1991; **91:** 393–400.

9 Van Essen GA, Kuyvenhoven MM, de Melker RA. Compliance with influenza vaccination. *Arch Fam Med* 1997; **6:** 157–162.

10 Nichol KL, Mac Donald R, Hauge M. Factors associated with influenza and pneumococcal vaccination behavior among high-risk adults. *J Gen Intern Med* 1996; **11:** 673–677.

11 SAS Proprietary Software Release 6.12. Cary (NC): SAS Institute Inc.

12 Hosmer DW, Lemeshow S. Applied logistic regression. In *Logistic Regression*. New York: John Wiley & Son, 1989: 87.

13 Ruhnke GW, Wilson SR, Akamatsu T *et al*. Ethical decision making and patient autonomy. A comparison of physician and patients in Japan and the United States. *Chest* 2000; **118:** 1172–1182.

14 Fetters MD. The family in medical decision making: Japanese perspectives. *J Clin Ethics* 1998; **9:** 132–146.

15 Tierney MJ, Minarik PA, Tierney LM. Ethics in Japanese health care: a perspective for clinical nurse specialists. *Clin Nurse Specialist* 1994; **8:** 235–240.

16 Sass HM, Veatch RM, Kimura R. *Advance Directives and Surrogate Decision Making in Health Care*. Baltimore (MD): The Johns Hopkins University Press, 1998: 175–186.

17 Nilchaikovit T, Hill JM, Holland JC. The effects of culture on illness behavior and medical care. Asian and American difference. *Gen Hosp Psychiatry* 1993; **15:** 41–50.

18 Kagawa-Shinger M, Blackhall LJ. Negotiating cross-cultural issues at the end of life. *J Am Med Assoc* 2001; **286:** 2993–3001.

19 Blachhall LJ, Murphy ST, Frank G, Michel V, Azen S. Ethnicity and attitudes toward patient autonomy. *J Am Med Assoc* 1995; **274:** 820–825.

20 Govaert TM, Dinant GJ, Aretz K, Masurel N, Sprenger MJ, Knottnerus JA. Adverse reactions to influenza vaccine in elderly people: randomised double blind placebo controlled trial. *Br Med J* 1993; **307:** 988–990.

21 Sackett DL. Bias in analytic research. *J Chron Dis* 1979; **32:** 51–63.